FORESTS OF VALUABLE BROAD-LEAVED TREES ON NON-CARBONATE BEDROCK IN SLOVENIA (*DRYOPTERIDO AFFINI-ACERETUM PSEUDOPLATANI* ASS. NOVA HOC LOCO)

Petra KOŠIR*

Izvleček

Na silikatni matični podlagi na območju Pohorja in okolice Litije, v alpskem in predalpskem območju Slovenije, smo preučili gozdove plemenitih listavcev. Opisali smo novo asociacijo *Dryopterido affini-Aceretum* ass. nova hoc loco. Sestoji asociacije poraščajo strma koluvialna pobočja, vznožja pobočij, pogosto v ozkih dolinah nad vodotoki ter pobočja hudourniških jarkov. Na rastiščih te gozdne združbe prevladujejo koluvialna distrična rjava tla, pojavljajo se tudi ranker in nerazvita koluvialno-deluvialna distrična tla. Asociacijo ločujejo vrste, ki označujejo njen šibki acidofilni značaj. Asociacijo smo členili na dve geografski varianti: *D.-A.* var. geogr. *typica* (Litija) in *D.-A.* var. geogr. *Dentaria trifolia* (Pohorje). Ekološko pa smo asociacijo členili v tri subasociacije: *D.-A. scopolietosum carniolicae*, *D.-A. polystichetosum setiferi*, *D.-A. leucojetosum vernae*. V okviru subasociacij *D.-A. polystichetosum setiferi* in *D.-A. leucojetosum vernae* smo ločili tipično varianto in varianto z vrsto *Fraxinus excelsior*. V okviru subasociacije *D.-A. leucojetosum* smo izločili še varianto z vrsto *Saxifraga rotundifolia*. Asociacijo smo uvrstili v zvezo ilirskih gozdov plemenitih listavcev *Fraxino-Acerion* Fukarek 1969. Sestoje nove asocijacije smo primerjali s sestoji drugih ilirskih javorjevih združb in sorodnih srednjeevropskih združb plemenitih listavcev.

Abstract

On the non-carbonate bedrock on the mountain range of Pohorje and in the vicinity of Litija, in the pre-Alpine and Alpine region of Slovenia, the forests of valuable broad-leaved trees were studied. A new association *Dryopterido affini-Aceretum* ass. nova hoc loco was described. The stands of this association thrive on steep colluvial slopes and their foothills, often in narrow valleys above streams and on slopes of torrential ditches. The colluvial dystric brown soil prevails on the sites of this forest community, but dystric leptosol and colluvial-delluvial dystric soil occur as well. The association is differentiated by the species which characterize its weak acidophilous character. It has been divided into two geographical races: *D.-A.* var. geogr. *typica* (Litija) and *D.-A.* var. geogr. *Dentaria trifolia* (Pohorje). Ecologically, it has been divided into three subassociations: *D.-A. scopolietosum carniolicae*, *D.-A. polystichetosum setiferi, D.-A. leucojetosum vernae*. Within the subassociation *D.-A. polystichetosum setiferi* and the subassociation *D.-A. leucojetosum vernae* we defined the typical variant and the variant with the species *Fraxinus excelsior*. Within the subassociation *D.-A. leucojetosum* we defined also the variant with the species *Saxifraga rotundifolia*. The new association was classified into the alliance *Fraxino-Acerion* Fukarek 1969. The stands of the new association have been compared with other Illyrian maple associations and related Central-European maple associations.

Ključne besede: *Dryopterido affini-Aceretum*, ilirska florna provinca, Slovenija, gozd plemenitih listavcev, sinsistematika, gozdna vegetacija, *Fraxino-Acerion*, nekarbonatna matična podlaga
Key words: *Dryopterido affini-Aceretum*, Illyrian floral province, Slovenia, forests of valuable broad-leaved trees, synsystematics, forest vegetation, *Fraxino-Acerion*, non-carbonate bedrock

* Institute of Biology, Scientific Research Centre of the Slovenian Academy of Sciences and Arts, Novi trg 2, p. b. 306, SI-1001 Ljubljana, petrako@zrc-sazu.si

1. INTRODUCTION

In Central Europe, forests of valuable broad – leaved trees of the submontane and montane belt on non-carbonate bedrock are mostly classified into the association *Lunario-Aceretum* Grüneberg et Schlüter 1957 (Wallnöfer & al. 1993, Clot 1990), within the Central-European alliance of forests of valuable broad-leaved trees *Tilio-Acerion* Klika 1955. Müller (1992), however, classifies the forests of valuable broad-leaved trees on silicate slopes within the alliance *Tilio-Acerion* into an independent suballiance *Deschampsio flexuosae-Acerenion* Müller 1992, and treats the maple stands on silicate as the community *Deschampsia flexuosa-Acer pseudoplatanus* Klauck 1987.

Forests of valuable broad-leaved trees on non-carbonate bedrock in Slovenia and other parts of the Illyrian floral province have not yet been studied in detail. Since in Slovenia and other parts of the Illyrian floral province carbonate bedrock prevails, so far forests of valuable broad-leaved trees in this area have been described above all on carbonate bedrock. In Slovenia there is only one silicate mountain range-Pohorje. On the Pohorje mountain range on non-carbonate bedrock, these forests were first mentioned by M. Wraber, first as the association *Acereto-Ulmetum* (Wraber 1953), and later as the association *Sorbo aucupariae-Aceretum* (Wraber 1960), but his findings were published without the relevé material. Based on his descriptions of the association *Sorbo aucupariae-Aceretum* thriving in the altimontane belt, Clot (1990) in his synoptic survey of European maple stands classified the community into the Central-European association of forests of valuable broad-leaved trees of the altimontane and subalpine belt *Ulmo-Aceretum*. In the pre-Alpine-Alpine region of the Illyrian floral province the forests of valuable broad-leaved trees on non-carbonate bedrock are mentioned also by Marinček (1994), who proposed the name *Dryopterido tavelli-Fraxinetum*. In his work on the vegetation of the Šumik virgin forest (Marinček 1995b) he described the forests of valuable broad-leaved trees with two relevés and provisionally named them the community *Acer pseudoplatanus-Ulmus glabra*.

Most communities of valuable broad-leaved trees described in the territory of Slovenia and the wider region of the Illyrian floral province are classified into the Illyrian alliance of forests of valuable broad-leaved trees *Fraxino-Acerion* Fukarek 1969 (P. Košir 2004). On account of its neutrophilous-basophilous character, Illyrian vegetation is bound above all on carbonate bedrock. This raises the question of whether the communities of valuable broad-leaved trees on non-carbonate bedrock in the region of the Illyrian floral province, where fewer Illyrian species are expected, are classified into the Central-European alliance of forests of valuable broad-leaved trees *Tilio-Acerion* or rather into the Illyrian alliance *Fraxino-Acerion*.

In this study we shall describe and present with an analytic table a new maple association *Dryopterido affini-Aceretum* ass. nova hoc loco, which occurs in the region of the Illyrian floral province on non-carbonate bedrock. By means of a comparative table of Illyrian maple and Central-European maple forest stands we shall define also their synsystematic classification.

2. METHODS

The relevés were made by applying the standard Central-European method (Braun-Blanquet 1964).

Vegetation relevés were made in late spring (May, June), when the vegetation is in its optimal phase and the species of both spring and summer aspect appear. Some of the plots were visited several times, so that the early spring aspect, as well as the summer aspect, were recorded. The species which were not developed at the time of the relevé were noted with +. The size of the sample plots was 200 to 400 m^2.

The collected vegetation relevés were organised together with the already published relevé material from the territory of the Illyrian floral province, partly also from Central Europe, in the TURBOVEG database (Hennekens in Schaminée 2001). To process and analyse the phytosociological relevés and their syntaxonomic classification we used the principal coordinate analysis ordination method (PCoA) from the computer package SYNTAX 2000 (Podani 2001). The dissimilarity coefficient was the similarity ratio.

When processing the vegetation relevés we used also the JUICE 6.1.10 (Tichý 2001) computer program to arrange the large phytosociological tables. When determining the diagnostic species we applied the measure of fidelity, which has become a frequently used method (Chytrý & al. 2002). The coefficient φ was used in the JUICE (Tichý 2001) program as it allows for a comparison of species fidelity in datasets of different size. The species with the highest fidelity values were treated as diagnostic.

In the table, the plant species were arranged according to the syntaxonomical groups, following the Central-European (Oberdorfer 1994, Clot 1990, Wallnöfer & al. 1993) and southeast-European authors (Horvat & al. 1974, Zupančič 1999, Marinček & al. 1993, Marinček & Čarni 2000). Mosses are mentioned separately.

The description of the association includes the chorological spectrum. The classification of species (with exception of mosses, which were not considered here) into a certain chorological group follows Poldini (1991) and partly Pignatti (1982).

Species which occur only once in the table and with a small cover value were excluded from the table and are mentioned in Appendix.

The names of vascular plants follow the *Liste der Gefässpflanzen Mitteleuropas* (Ehrendorfer 1973). When discussing the genera *Stellaria* and *Helleborus* we considered the new proposals from the *Mala flora Slovenije-Ključ za določanje praprotnic in semenk* (Martinčič & al. 1999). When looking for the names of ferns we followed the *Illustrierte flora von Mitteleuropa-Pteridophyta* (Kramer 1984), especially for the names of hybrids which are missing from the other lists of plants. For the names of mosses we used the *Seznam listnatih mahov (Bryopsida) Slovenije* (Martinčič 2003).

The newly described syntaxa were named according to the *Code of phytosociological nomenclature* (Weber & al. 2000). The Code does not treat the syntaxa of the ranks such as geographical race, variant and subvariant, which means that there are no current rules for their denomination.

The association was subdivided into lower syntaxonomical units applying the principle of multidimensional division of vegetation units (W. & A. Matuszkiewicz 1981). The results of the horizontal division (geographical axis) of vegetation units are geographically-macro-climatically conditioned subunits of the association (geographical races, geographical subraces). The vertical division into altitudinal forms is illustrated with the altitudinal axis. The expression of the site diversity in a smaller area, shown on the so called site axis, are the ecological (edaphically-microclimatically) conditioned subunits (subassociations, variants, subvariants). According to Matuszkiewicz (1981: 132), the three systematic categories mentioned are independent. Widely distributed associations are first divided into regional and vertical units, and then into subassociations. This means that a certain site subunit (subassociation) can occur in several or even all geographical subunits. On the other hand, however, there are also subassociations which are bound to a certain geographical subunit.

The soil conditions were studied with the representative soil profiles.

The soil profiles were described by Tomaž Prus, M. Sc., and the chemical analyses were conducted in the laboratories of the Pedology and Environment Protection Centre of the Biotechnical Faculty in Ljubljana.

The methods and conceptions used in the descriptions of the soil profiles follow Zupan & al. (1998).

3. RESULTS AND DISCUSSION

3a. Ecological circumstances and the study area

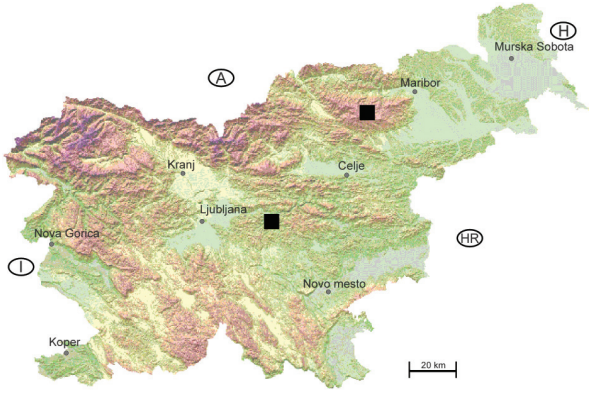

Figure 1: Study areas of the association *Dryopterido affini-Aceretum* in Slovenia
Slika 1: Območja raziskovanja asociacije *Dryopterido affini-Aceretum* v Sloveniji

In Slovenia, the stands of this association were found in the pre-Alpine and Alpine region, in the vicinity of Litija and on the non-carbonate Pohorje massif (Fig. 1), where they grow on steep colluvial slopes and their foothills, the slopes of narrow valleys (gorges and ravines), often above streams, and on slopes of torrential ditches. The contact community of the stands of valuable broad-leaved trees in the vicinity of Litija is *Blechno-Fagetum* I. Horvat ex Marinček 1970, but on Pohorje the stands of valuable broad-leaved trees occur in the wider distribution area of the zonal forest community *Cardamino savensi-Fagetum* Ž. Košir 1962 var. *Abies alba* Ž. Košir 1979 (var. silicicolum). On cold aspects on non-carbonate bedrock this community can grow

as low as at 400 m a. s. l. The community on Pohorje is in contact also with the stands of the association *Galio rotundifolii-Abietetum* M. Wraber (1955) 1959, which covers large surfaces on the Pohorje mountain range.

The larger part of Slovenia, as well as the study area of Litija and its vicinity, is part of the Illyrian floral province (Zupančič & al. 1987, Marinček 1994). Regarding Pohorje area, there are different opinions. Zupančič & al. (1987) exclude it from the Illyrian floral province and classify it within the Euro-Siberian-North-American region into the Central-European province, whereas Marinček (1994), despite the silicate bedrock, includes Pohorje into the region of the Illyrian floral province.

The association *Dryopterido affini-Aceretum* most often overgrows the northeastern and eastern aspects; more rarely, in narrow ravines, it occurs also on warmer aspects (SW, S to NW). It grows at altitudes between 300 and 800 m (more rarely also higher, between 900 and 1200 m). It is mostly found on steep slopes (from 30° to 45°, and even 60°), rarely on moderately steep slopes (5° to 25°).

The range of surface stoniness is 0 to 40 % (even 60 and 80 %), but in the largest part there is either no stoniness or it is insignificant (up to 20 %). There is mostly non-calcereous rubble, and in the stands along the torrential ditches also larger rocks or rock blocks.

Geological bedrock of the Pohorje mountains consists mostly of tonalites (the top and the eastern part of Pohorje). The main ingredient of the Pohorje tonalites are plagioclases. Their basicity is high (33 %), which is why the Pohorje tonalites are classified on the border between the acidic and neutral, and among neutral silicates (Ž. Košir 1979). On the margins of this tonalite mass the tonalites are followed by gneiss, mica schist, amphibolite, eclogite, serpentinite, clorite-amphibolite slate and marble. Andesite and dacite, as well as flint-sericitic filit and filitoid slates with diabase are present in the lower parts of the western Pohorje (Slovenia-Geološka karta 1 : 500 000, 1993). In the region of Litija, however, the geological bedrock consists of Permian-carboniferous slaty claystones and flint sandstones (Slovenia-Geološka karta 1 : 500 000, 1993).

Colluvial dystric brown soil prevails on the sites of this forest community, but also dystric Leptosol and colluvial-delluvial dystric soil occur (Fig. 5). The soil profiles made in the stands of this association (Table 1, 2, 3 and 4) show that in general the soil has relatively high values of cation exchange capacity (T), but compared to the soil on carbonate bedrock they have a lower content of base-forming cations in the soil (S), which results in a lower V value (portion of base-forming cations). C/N proportions are less favourable, which is the result of the lower pH values. The soil under the stands of valuable broad-leaved trees is colluvial. It is frequently refreshed on account of regular deposits of material and water, which contributes to a relatively fast mineralization (despite the lower pH values) and a continuous biological circulation of material.

Litija is situated in the region of the moderately continental climate of central Slovenia. Characteristic for it is a mean annual temperature of the coldest month (January) between 0 and –3°C, and a mean annual temperature of the warmest month (July) between 15 and 20°C. Another characteristic is the subcontinental rainfall regime with 1000 to 1300 mm yearly. The most rainfall comes down in summer, the least in winter. The Pohorje mountain range lies in northern Slovenia within the region of the climate of the lower montane world and the valleys between (Ogrin 1996). The common characteristic of the montane climate in Slovenia is that the mean temperatures of the coldest month are below –3°C and above 10 °C in the warmest month. The Pohorje rainfall regime is continental, which means that it gets between 1100 and 1700 mm of rainfall yearly.

3b. Structural and floristic composition

The upper tree layer covers between 60 and 90 % of the surface, the lower up to 60 %. Either *Fraxinus excelsior* or *Acer pseudoplatanus* prevail in the tree layer, but *Ulmus glabra* and *Picea abies* occur as well. *Carpinus betulus* is found in the stands of the association at lower altitudes, and *Fagus sylvatica* at higher altitudes. On the most humid sites in the stands two other species can be noticed – *Alnus incana* or *Alnus glutinosa. Abies alba,* however, occurs only within the geographical race *Dentaria trifolia* on Pohorje. *Corylus avellana*, and more rarely *Sambucus nigra*, are also common shrub species in the lower tree layer.

For the most part, the shrub layer is poorly developed and most often covers only 5 – 10 % of the surface, occasionally also up to 30 % or more (40, 60 %). The most common species are *Rubus fruticosus* agg., *Sambucus nigra* and *Corylus avellana*. The

most common among the tree species in the shrub layer are *Ulmus glabra*, *Acer pseudoplatanus*, *Picea abies* and *Fraxinus excelsior*.

The herb layer is well developed and covers between 80 and 100 % of the surface, except for the rockier sites, where these values are lower (60, 70 %). Well represented are the species of the alliance *Fraxino-Acerion*. *Stellaria montana*, *Adoxa moschatellina*, *Urtica dioica*, *Doronicum austriacum* and *Geranium robertianum* have the highest constancy and coverage. The species *Lunaria rediviva* appears with a lower constancy, but reaches high cover values in the stands. It is the same with the species *Scopolia carniolica*, *Lamium orvala* and *Polystichum setiferum*. Species of the order *Fagetalia sylvaticae* Pawł. in Pawł. et al. 1928 are the most common; among them, *Petasites albus* stands out with its constancy and coverage. Other species with high constancy and large coverage are also *Symphytum tuberosum*, *Lamiastrum flavidum*, *Mercurialis perennis* and *Asarum europaeum*. Other well represented species are those of the alliance *Alno-Ulmion* Br.-Bl. et Tx. 1943 and class *Vaccinio-Piceetea* Br.-Bl. in Br.-Bl. et al. 1939. Within the alliance *Alno-Ulmion* the species *Impatiens noli-tangere* and *Chrysosplenium alternifolium* stand out for their coverage and constancy, as do *Oxalis acetosella*, *Dryopteris affinis*, *Gentiana asclepiadea*, *Dryopteris dilatata*, *Luzula luzuloides* and *Phegopteris connectilis* among the species of the class *Vaccinio-Piceetea*. The last three species are also the differential species of the association. Other syntaxonomical groups are more poorly represented. Also to be mentioned here are the species *Anemone nemorosa* (*Querco-Fagetea* Br.-Bl. et Vlieg. in Vlieg. 1937), *Athyrium filix-femina* and *Senecio fuchsii* (*Adenostyletalia* G. et J. Br.-Bl. 1931).

For the most part, the moss layer covers only a small surface (5–10 %) or none at all. Only rarely does it cover up to 20 or 30 % of the surface, exceptionally even more. Non-carbonate rocks are often bare or only slightly covered with mosses. The most common and with the highest cover values is *Plagiomnium undulatum*, followed by *Plagiothecium nemorale*, *Brachythecium rutabulum*, *Hypnum cupressiforme* and *Eurhynchium angustirete*. The most common among the differential species of the silicate communities (acidophilous species) are those of the order *Plagiothecium* (the already mentioned *P. nemorale* and *P. denticulatum*) and of the orders *Polytrichum* (*P. formosum* and *P. comune*), as well as the species *Atrichum undulatum*. Diversity of the species is substantial – we determined as many as 41 different moss species.

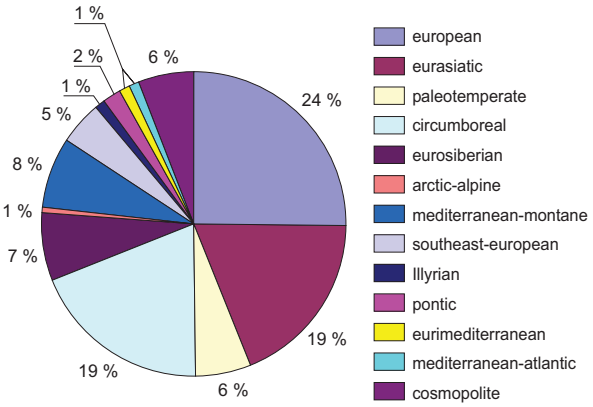

Figure 2: Syntaxonomical spectrum of the association *Dryopterido affini-Aceretum*
Slika 2: Sintaksonomski spekter asociacije *Dryopterido affini-Aceretum*

Figure 2 presents the species composition of the community in view of the syntaxonomical classification with the syntaxa. On account of their substantial diversity, mosses represent the highest proportion (18 %) in the picture, although the moss layer is generally poorly developed. The highest proportion (18 %) goes also to the species of the order *Fagetalia sylvaticae*, which is in accordance with the synsystematic classification of the stands. They are followed by the species of the alliance *Fraxino-Acerion* (13 %) and *Alno-Ulmion* (11 %). A relatively high proportion of the species of the alliance *Alno-Ulmion* indicates the hygrophilous character of the association; the sites of these communities are extremely well saturated because of the bedrock with low capacity for water permeation. Water often trickles along the slopes, and the stands thrive on the slopes along mountain streams. A relatively high proportion goes also to the species of the class *Vaccinio-Piceetea* (10 %), which indicates a moderately acidophilous character of the community of valuable broad-leaved trees on non-carbonate bedrock. Other groups are not as well represented.

The composition of floral elements is presented in **Figure 3**. The European floral element prevails in this association (24 %) and is followed by the same proportion of circumboreal and Eurasian (19 %) floral element. The studied association is differentiated from other Central-European communities by the Mediterranean-montane (8 %), southeast-European (5 %) and Illyrian (1 %) floral element. Other floral elements are not so representative.

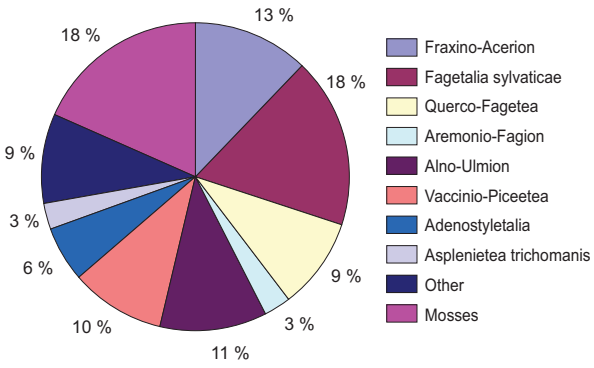

Figure 3: Geoelemental spectrum of the association *Dryopterido affini-Aceretum*
Slika 3: Geoelementni spekter asociacije *Dryopterido affini-Aceretum*

The holotype of the association *Dryopterido affini-Aceretum* is relevé No. 26 in Table 5 hoc loco.

3c. Diagnostic species

As the associations of forests of valuable broad-leaved trees are often without character species or even without specific differential species, Clot (1990) establishes the associations of the Central-European maple forests on the basis of a combination of ecological groups of species. Wallnöfer & al. (1993) also described the associations of Central-European alliance of valuable broad-leaved trees *Tilio-Acerion* in Austria based on such a diagnostic combination of species where a group of character species is often missing. This article, too, determines a new association which is floristically sufficiently different from the related maple communities above all on the basis of differential species.

The differential species of the association *Dryopterido affini-Aceretum* are: *Dryopteris affinis*, *Luzula luzuloides*, *Dryopteris dilatata*, *Phegopteris connectilis* and *Gymnocarpium dryopteris*. All of the species are classified into the class *Vaccinio-Piceetea*. The listed species reach their optimal growth on non-carbonate rocks and thus indicate the moderately acidophilous character of the association.

The association was named after the species *Dryopteris affinis*, which is the most common among the species listed above and reaches the highest cover values. It thrives on humid soil rich in nutrients and poor in limestone, on sites with high air humidity (Kramer 1984). It is found in humid and shady montane beech and fir forests, mostly on sites of silicate bedrock (Oberdorfer 1994). Poldini (1991) discusses it within the group of the European floral element. Ž. Košir (1994) studied thoroughly the species *Dryopteris affinis* in Slovenia in connection with the communities of *Abies alba* on silicate. He found that the species occurs with a high constancy and coverage on acidic sites, i.e. in the environment where the species *Dryopteris filix-mas* occurs with a substantially lower vitality. He also mentioned the hybrid *Dryopteris X tavelii* (a hybrid between *Dryopteris filix-mas* and *Dryopteris affinis*), which is supposed to be the most common species on deep, rather unstable silicate colluvial soil with an expressive hillside water influence and »aceretal« character. Marinček (1994), who provisionally named the forests of valuable broad-leaved trees on non-carbonate bedrock after this hybrid, is of a similar opinion. However, Kramer (1984) establishes that on sites with both parental species the hybrid occurs only individually and never forms entire populations. It does not reproduce by spores. *Dryopteris X tavelii* should therefore be treated as a hybrid and not as a species, so it was not specifically dealt with in our relevés. According to Kramer (1984), the publications which mention the whole populations of this hybrid confused it with the subspecies *Dryopteris affinis* subsp. *robusta*, which is very similar to the hybrid.

4d. Division of the association into lower syntaxonomical units

Within the association we distinguish two geographical races:

- *D.-A.* var. geogr. *typica* var. geogr. nova hoc loco (the vicinity of Litija) and
- *D.-A.* var. geogr. *Dentaria trifolia* var. geogr. nova hoc loco (Pohorje).

The differential species of *D.-A.* var. geogr. *Dentaria trifolia* are: *Dentaria trifolia*, *Hieracium transsylvanicum* and *Abies alba*. They characterize the thriving of these stands in the wider distribution area of the community *Cardamino savensi-Fagetum* var. *Abies alba*. The stands of the typical race were found in the pre-Alpine region of Slovenia. The race is characterized by the species *Scopolia carniolica*, which grows abundantly in these stands.

Ecologically, the association was subdivided into three subassociations:

- *D.-A. scopolietosum carniolicae* subass. nova hoc loco
- *D.-A. polystichetosum setiferi* subass. nova hoc loco
- *D.-A. leucojetosum vernae* subass. nova hoc loco

Subassociation *D.-A. scopolietosim carniolicae* subass. nova hoc loco (Table 5/1–7) Stands of this subassociation grow on steep, very moist slopes and their foothills in narrow valleys with a small stream, in the submontane belt. The differential species of the subassociation are: *Scopolia carniolica*, *Blechnum spicant*, *Alnus glutinosa*, *Cardamine amara* and *Equisetum pratense*. *Blechnum spicant* indicates that the contact community of the stands of this association is the community *Blechno-Fagetum*. Other species indicate very moist soil on the bedrock which has low capacity for water permeation. Also indicative of moist sites is *Carex brizoides*, which is very common in the stands. *Carpinus betulus*, which is indicative of the stands in the submontane belt, is relatively well represented mostly in the lower tree layer. The stands of this subassociation overgrow the most humid and the most acidic sites within the association, as is demonstrated also in the analysis of the soil profile. Dystric Cambisols prevail (Table 1).

Table 1: Soil profile description (profile 1)
Tabela 1: Opis pedološkega profila (profil 1)

Profile 1
Locality: Litija, ravine under Špik, relevé No. 7 (Table 5), the foot of the slope without surface rockiness and stoniness
Bedrock: Permcarbonian slate claystone and sandstone
Soil type: Dystric Cambisol

Profile description:
Ol: 4 (2) – 0 cm; maple, durmast oak, hornbeam and beech foliage
A: 0–14 cm; silty loam, subangular blocky structure, very humose; medium distinct peds – relatively unstable; consistence is loose and friable; dark brown in colour, 7,5 YR 3/2; moist and with a common abundance of fine and medium roots; 15 % of the skeleton consisting of sharp-edged particles up to 1 cm in size; wide C/N proportion – moder
BvC: 14 – 43 cm; angular blocky structure, of medium stability and medium distinct peds, clayey texture; consistence is friable to firm; medium humose on account of organic substance distributed in the passages of withered roots; the colour is yellowish brown, 10 YR 5/4; as wet as the upper horizon, with only individual roots; 30 % of the skeleton, sharp-edged, up to 5 cm in size; gradual transition into the next horizon
CBv: 43 – 85+ cm; of the same structure as the upper – angular blocky structure, medium distinct peds with medium stability, clayey texture; its consistency is crumbly; contains small amounts of humus on account of organic matter distributed in the passages of withered roots; the colour is yellowish brown, 10 YR 5/4; as wet as the upper two horizons, also with only individual roots; 60 % of skeleton, sharp-edged up to 10 cm in size; gradual transition into the next horizon

		pH	P_2O_5 AL	K_2O AL	org. matter	C	CN prop.	N toget.	sand	silt coarse	silt fine	silt toget.	clay	text. class
HORIZON	depth	$CaCl_2$	---mg/100g---		%	%		%	%	%	%	%	%	
A	0–14 cm	4.4	2.7	21.6	12.7	7.4	22.4	0.33						
BvC	14–43 cm	4.1	0.2	13.7	2.4	1.4	8.8	0.16	41.6	9.9	34.1	44.0	14.4	L
CBv	43–85 cm	4.2			1.9	1.1	9.2	0.12	48.5	10.0	22.3	32.3	19.2	L

AMMONACETATE extraction

		Ca	Mg	K	Na	H	S	T	V	Ca	Mg	K	Na	H
HORIZON	depth	---------- mmol C_+ / 100g sample ----------							%	%	%	%	%	%
A	0–14 cm	3.09	0.89	0.55	0.01	20.85	4.5	25.4	17.7	12.2	3.5	2.2		82.1
BvC	14–43 cm	0.52	0.25	0.32	0.01	17.45	1.1	18.6	5.9	2.8	1.3	1.7	0.1	93.8
CBv	43–85 cm	1.85	0.39	0.28	0.01	14.00	2.5	16.5	15.2	11.2	2.4	1.7	0.1	84.8

NOTE: Moder of BvC as well as of CBv horizon contains a large amount of highly mouldering brown claystones, up to 5 mm in size. Larger pieces are sandstones.
The wide C/N proportion is somewhat surprising; it could be the consequence of the colder aspect. The soil is very acidic and very badly saturated with base-forming cations.

Holotype of the subassociation *Dryopterido affini-Aceretum scopolietosum carniolicae* is relevé No. 3 in Table 5 hoc loco.

Subassociation *D.-A. polystichetosum setiferi* subass. nova hoc loco (Table 5/ 8–19, Fig. 6)

The stands of this subassociation grow on steep colluvial slopes and foothills, alluvial fans and concavities, in valleys with permanent running water of the submontane and partly also montane belt. In comparison with *D.-A. leucojetosum vernae* the subassociation *D.-A. polystichetosum setiferi* thrives at lower altitudes, and compared to *D.-A. scopolietosum carniolicae*, which also thrives at lower altitudes, the stands of the studied subassociation occur on warmer sites. The differential species of the subassociation are: *Polystichum setiferum*, *Polystichum x bicknelli*, *Polystichum* x *wirtgenii*, *Aegopodium podagraria*, *Brachypodium sylvaticum* and *Glechoma hirsuta*. Especially characteristic is the abundant growth of the fern *Polystichum setiferi* and its hybrid *Polystichum* x *bicknelli* (=*P. aculeatum* x *P. setiferum*). The differential species indicate the growth of the stands at lower altitudes and on warmer sites that are well supplied with water. Also indicative of the wet soil are the species *Carex brizoides* and *Festuca gigantea*, which are well represented in the stands. Another indicator which proves that the stands thrive above all in the submontane belt is the presence of the species *Carpinus betulus*. Sporadic occurence of the species *Castanea sativa* in the stands of this subassociation indicates that the stands on warmer aspects are in contact with the community *Castaneo sativae-Fagetum* (M. Wraber 1955) Marinček et Zupančič 1995.

Various soil types occur, among them Dystric Leptosol (Table 2) and colluvial-delluvial dystric soil (Hyperskeletic Dystric Leptosol, Table 3).

Table 2: Soil profile description (profile 2)
Tabela 2: Opis pedološkega profila (profil 3)

Profile 2
Locality: Pohorje, Ruše in the direction of Lobnica, relevé No. 11 (Table 5), stream valley, numerous lateral springs, steep and landslide slopes
Bedrock: Slate
Soil type: DYSTRIC LEPTOSOL

Profile description:
Ol: mosaically scattered, in places bare surface; beech, chestnut, hornbeam, maple and ash tree foliage, spruce needles
A: 0-15(20) cm; silty loam of subangular blocky structure, humose; medium distinct peds with medium stability; consistence is loose and friable; the colour is black 10YR 2,5/1; fresh, abundant roots ; singular skeleton, sharp-edged and platy, up to 4 cm in size; C/N proportion is characteristic for moder mull. Sharp transition into C.
C: 15(20)+ cm

		pH	P_2O_5 AL	K_2O AL	org. matter	C	CN prop.	N toget.
HORIZON	depth	$CaCl_2$	---mg/100g---		%	%		%
A	0-15 cm	4.9	6.5	6.5	6.2	3.6	18.0	0.20

AMMONACETATE extraction

		Ca	Mg	K	Na	H	S	T	V	Ca	Mg	K	Na	H
HORIZON	depth	---------- mmol C_+ / 100g sample ----------							%	%	%	%	%	%
A	0-15 cm	6.91	1.37	0.13	0.01	13.30	8.4	21.7	38.7	31.8	6.3	0.6		61.3

NOTE: Colluviation is visibile in the surface shifting (and depositing) of stone gravel mixed with organic matter in practically the entire soil profile. For this reason even Bv horizon comprises relatively large amounts of organic matter. Shifting processes resulting from leaching are less important due to the considerable incline, but are probably also present.

Table 3: Soil profile description (profile 3)
Tabela 3: Opis pedološkega profila (profil 3)

Profile 3
Locality: Pohorje, the Lobnica valley, relevé No. 18 (Table 5), the bottom slope or the foothills of a smaller valley, non-rocky
Bedrock: slate
Soil type: HYPERSKELETIC DYSTRIC LEPTOSOL

Profile description:
Ol: mosaically scattered, in places bare surface; beech, ash, rarely also maple foliage
(A): 0–11 cm; subangular to angular blocky sandy loam, humose; medium distinct peds – unstable; consistence is friable and fine; the colour is dark reddish brown, 5YR 4/2; fresh, roots abundance is common; 40 % of skeleton, sharp-edged up to 5 cm in size; C/N proportion is still characteristic for mull.
I: 11–32 cm; sandy loam of fine angular blocky structure, with small amounts of humus; medium distinct peds – unstable; consistence is fine; the colour is reddish brown, 5YR 4/4; fresh, roots abundance is common; 60 % of skeleton composed of sharp-edged particles up to 10 cm; C/N proportion is characteristic for mull to already moder mull.
II: 32–97 cm; fine angular blocky sandy loam, poorly humose to mineral; weakly distinct peds – unstable; consistence is fine; the colour is dark brown to brown 7,5YR 4/4; fresh, roots abundance is common; 80 % of skeleton composed of sharp-edged particles up to 5 cm in size; C/N proportion is characteristic for mull.
III: 97+ cm; very thick stones and rocks bigger than 20 cm

		pH	P_2O_5 AL	K_2O AL	org. matter	C	CN prop.	N toget.
HORIZON	depth	$CaCl_2$	---mg/100g---		%	%		%
(A)	0–11 cm	4.8	1.7	17.5	6.3	3.6	13.8	0.26
I	11–32 cm	4.5			1.5	0.9	15.0	0.06
II	32–97 cm	4.9			1.1	0.6	12.0	0.05

AMMONACETATE extraction

		Ca	Mg	K	Na	H	S	T	V	Ca	Mg	K	Na	H
HORIZON	depth	---------- mmol C_+ / 100g sample ----------							%	%	%	%	%	%
(A)	0–11 cm	5.11	1.26	0.42	0.01	15.80	6.8	22.6	30.1	22.6	5.6	1.9		69.9
I	11–32 cm					13.00								
II	32–97 cm					9.75								

NOTE: Up to 0.5 cm of dark humus on the surface above (A) horizon, mostly brown alluvium.

We distinguish two variants within the subassociation; the variant *typica*, whose tree layer is dominated by the species *Acer pseudoplatanus* and the variant with the species *Fraxinus excelsior*, whose dominant tree species is *Fraxinus excelsior*.

Holotype of the subassociation *Dryopterido affini-Aceretum polystichetosum setiferi* is relevé No. 8 in Table 5 hoc loco.

Subassociation *D.-A. leucojetosum vernae* subass. nova hoc loco (Table 5/ 20–37) occurs in the montane and partly also in the altimontane belt of the Pohorje massif, where it overgrows steep colluvial slopes (not necessarily above streams) and slopes of torrential ditches. Compared to the stands of the other two subassociations it grows at higher altitudes and on less moist soils. Differential species of the subassociation, which indicate above all the thriving of these stands in the montane belt, are: *Leucojum vernum*, *Calamagrostis arundinacea*, *Polygonatum verticillatum*, *Dentaria bulbifera*, *Paris quadrifolia* and *Festuca altissima*. *Calamagrostis arundinacea* indicates the thriving of the stands on moderately acidic sites and more considerable inclines. In the stands of this association also the species *Sorbus aucuparia* occurs occasionally in the tree layer, although it was not found at lower altitudes of these stands.

Three variants were distinguished within the subassociation *leucojetosum vernae*: the variant *typica*, where the tree layer is dominated by the species *Acer pseudoplatanus*, the variant with the species

Fraxinus excelsior (as the most initial within this subassociation), where the tree layer is dominated by *Fraxinus excelsior,* and at highest altitudes the variant with the species *Saxifraga rotundifolia* (altimontane belt) with *Saxifraga rotundifolia*, *Cicerbita alpina*, *Ribes petraeum* and *Viola biflora* as differential species.

Within the syntaxon *D.-A. leucojetosum vernae* var. *typica* two previously published relevés are also included, namely the two relevés published by Marinček (1995b, Table 3/1–2) named *Acer pseudoplatanus-Ulmus glabra* (nom. prov.) are included in Table 5 as relevés no. 31 and no. 35.

The soil profile was made within the variant with the species *Fraxinus excelsior.* Colluvial dystric brown soil (Cumuli Dystric Cambisol) occure (Table 4).

Holotype of the subassociation *Dryopterido affini-Aceretum leucojetosum vernae* is relevé No. 26 in Table 5 hoc loco.

Table 4: Soil profile description (profile 4)
Tabela 4: Opis pedološkega profila (profil 4)

Profile 4
Locality: Pohorje, Fram-Ranče, relevé No. 24 (Table5), the middle of the slope, non- rocky, northern exposition
Bedrock: metamorphic slates
Soil type: Dystric brown soil,colluvial (CUMULI DYSTRIC CAMBISOL)

Profile description:
Ol: 1–0; evenly covers Oh; maple, beech and ash foliage, herb remains
Oh: 0–2 cm; cloddy structure, mostly organic matter; weakly distinct peds – unstable; of loose and friable consistence; the colour is dark brown, 7,5YR 3/2; dry to fresh, many fine and medium roots; skeleton is singular, sharp-edged up to 2 cm in size; C/N proportion is still characteristic for mull
A: 2–25 cm; silty loam of cloddy structure, humose; weakly distinct peds – unstable; of loose and fine consistence; the colour is brown to dark brown, 7,5YR 4/4; fresh, abundant roots; 30 % of skeleton composed of sharp-edged particles up to 5 cm in size; C/N proportion is characteristic for moder
Ab: 25–51 cm; subangular blocky loam, very humose; weakly distinct peds – rather unstable; of loose and friable consistence; the colour is dark reddish brown, 5YR 3/2,5; fresh, abundant roots; 30 % of skeleton composed of sharp-edged particles up to 5 cm in size; C/N proportion is characteristic for moder.
Note: buried horizon-former surface horizon.
Bv: 5 –120+ cm; small angular blocky loam, medium humose; weakly distinct peds – rather unstable; of loose and friable consistence; the colour is brown to dark brown, 7,5YR 4/4; fresh, roots abundance is common; 40 % of skeleton composed of sharp-edged particles up to 5 cm in size; C/N proportion is characteristic for mull.

		pH	P_2O_5 AL	K_2O AL	org. matter	C	CN prop.	N	sand	silt coarse	silt fine	silt toget.	clay	text. class
HORIZON	depth	$CaCl_2$	---mg/100g---		%	%		%	%	%	%	%	%	
Oh	0- 2 cm	4.3			37.1	21.5	14.9	1.44						
A	2- 25 cm	4.2	1.3	8.4	8.3	4.8	21.8	0.22	53.0	13.9	19.2	33.1	12.9	SL
Ab	25- 51 cm	4.3	0.5	5.0	10.7	6.2	23.8	0.26	39.2	15.6	22.2	37.8	23.0	L
Bv	51–120 cm	4.6			3.9	2.3	14.4	0.16	40.5	17.8	21.2	38.8	20.7	L

AMMONACETATE extraction

		Ca	Mg	K	Na	H	S	T	V	Ca	Mg	K	Na	H
HORIZON	depth	---------- mmol C_+ / 100g sample ----------							%	%	%	%	%	%
Oh	0- 2 cm													
A	2- 25 cm	0.37	0.21	0.17	0.01	27.00	0.8	27.8	2.9	1.3	0.8	0.6		97.1
Ab	25- 51 cm	0.20	0.15	0.11	0.01	33.70	0.5	34.2	1.5	0.6	0.4	0.3		98.5
Bv	51–120 cm	0.24	0.10	0.10	0.02	26.30	0.5	26.8	1.9	0.9	0.4	0.4	0.1	98.1

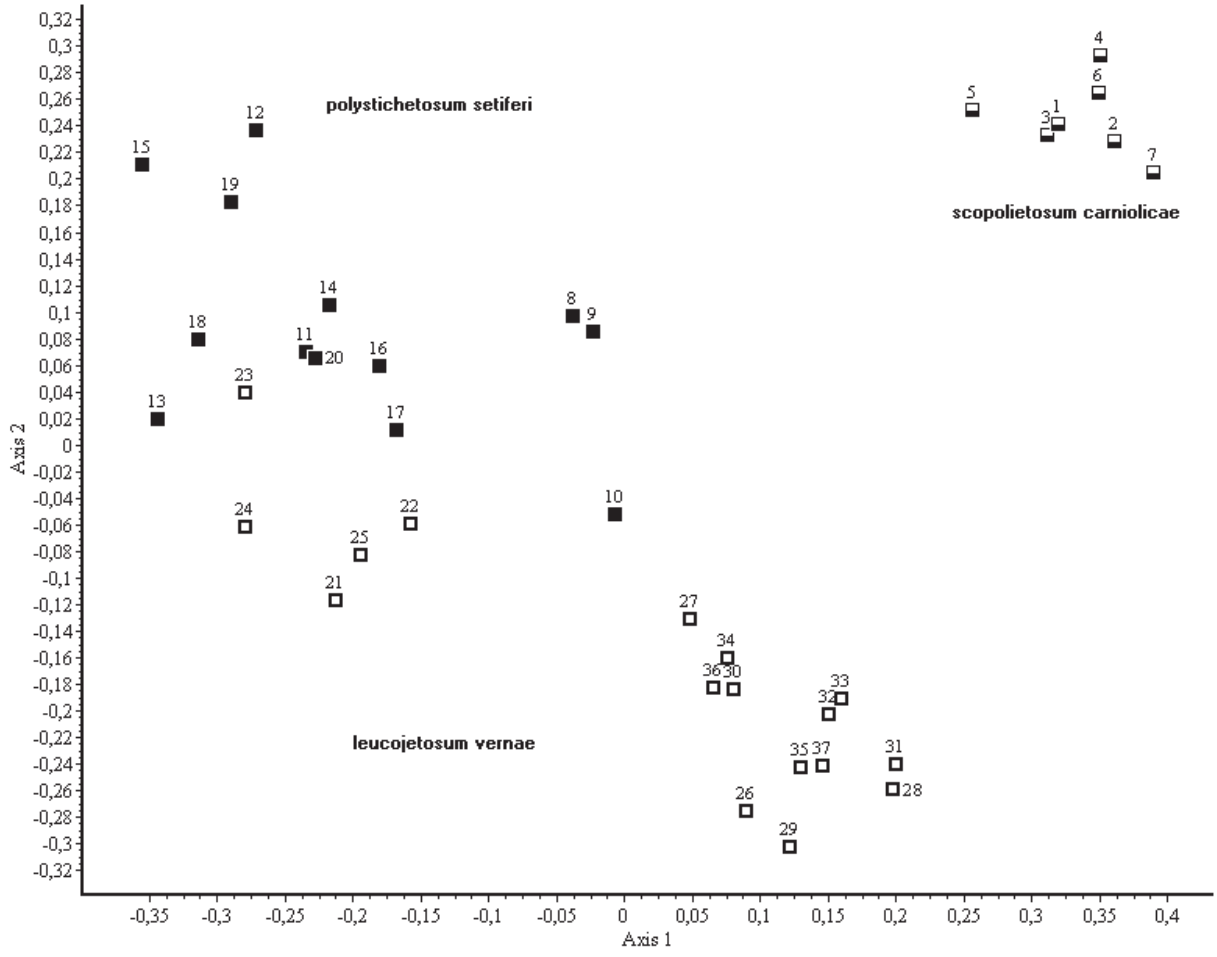

Figure 4: Ordination of the relevés of the association *Dryopterido affini-Aceretum* after the analytic table (Table 5). Legend: ⬓ – *D.-A. scopolietosum carniolicae*, ■ – *D.-A. polystichetosum setiferi* (var. *typica*: relevés 8–10, var. *Fraxinus excelsior*: relevés 11–20), □ – *D.-A. leucojetosum vernae* (var. *Fraxinus excelsior*: relevés 21–25, var. *typica*: relevés 26–35, var. *Saxifraga rotundifolia*: relevés 36–37).

Slika 4: Ordinacija popisov asociacije *Dryopterido affini-Aceretum* po analitični tabeli (Tabela 5). Legenda: ⬓ – *D.-A. scopolietosum carniolicae*, ■ – *D.-A. polystichetosum setiferi* (var. *typica*: popisi 8–10, var. *Fraxinus excelsior*: popisi 11–20), □ – *D.-A. leucojetosum vernae* (var. *Fraxinus excelsior*: popisi 21–25, var. *typica*: popisi 26–35, var. *Saxifraga rotundifolia*: popisi 36–37).

Ordination of the relevés of the association *Dryopterido affini-Aceretum* is presented in **Figure 4**. The stands of the two geographical races clearly separate along axis 1, as do within the geographical race *D.-A.* var. geogr. *Dentaria trifolia* also the maple stands (from the syntaxa *D.-A. polystichetosum setiferi* var. *typica* and *D.-A. leucojetosum vernae* var. *typica* and var. *Saxifraga rotundifolia*), which separate from the stands with european ash tree (from the syntaxa *D.-A. polystichetosum setiferi* var. *Fraxinus excelsior* and *D.-A. leucojetosum vernae* var. *Fraxinus excelsior*). The relevés along axis 2 were arranged with regard to altitude. In accordance with the previous findings the stands of the subassociations *D.-A. scopolietosum carniolicae* and *D.-A. polystichetosum setiferi* overgrow the lower sites and the stands of the subassociation *D.-A. leucojetosum*, the stands at higher altitudes.

3.e The syntaxonomical classification of the association (Synoptic Table 6):

For a long time, the synsystematic classification of forests of valuable broad-leaved trees in the region of the Illyrian floral province was unclear. The following opinions prevailed regarding the synsystematic classification: 1. classification into the alliance *Aremonio-Fagion* (Horvat 1938, 1962, Glavač 1958),

and further either into an independent suballiance of Illyrian forests of valuable broad-leaved trees *Polysticho setiferi-Acerenion* Borhidi & Kevey 1996 (or *Lamio orvalae-Acerenion* Marinček 1990) (Borhidi & Kevey 1996, Kevey 1997, Kevey & Borhidi 1998, Borhidi 2003, Poldini & Nardini 1993, Marinček 1990, 1995, P. Košir & Marinček 1999, Dakskobler 1999, P. Košir 2000, 2002) or within the suballiance of montane beech forests *Lamio orvalae-Fagenion* (Accetto 1991, Vukelić & Rauš 1998); 2. classification within the Central-European alliance *Tilio-Acerion*, but as a specific geographical race of Central-European associations (Zupančič 1996, Zupančič & Žagar 1999) or 3. classification into an independent alliance of forests of valuable broad-leaved trees of the Illyrian floral province *Fraxino-Acerion* (Fukarek 1969, Jovanović & al. 1986, Stefanović 1986). The latest research (P. Košir 2004) has shown that the forests of valuable broad-leaved trees of the Illyrian floral province can be classified into an independent alliance *Fraxino-Acerion* within the order *Fagetalia sylvaticae*. The results of the latest research (P. Košir 2004) were considered in this article too.

The synoptic table (Table 6) gives a comparison of the studied syntaxon with certain syntaxa of the Illyrian forests of valuable broad-leaved trees, and a comparison with the similar syntaxa on silicate bedrock from Central Europe. The table demonstrates the presence of the differential species of the association *Dryopterido affini-Aceretum*, character species of the alliance of Illyrian forests of valuable broad-leaved trees, regional character species of the alliance *Fraxino-Acerion* and the species of Illyrian alliances within the order *Fagetalia sylvaticae*, *Aremonio-Fagion* and *Erythronio-Carpinion*, which occur in the region of the Illyrian floral province also in the forests of valuable broad-leaved trees of the alliance *Fraxino-Acerion*. Regionally characteristic species (Dierschke 1994) are those which are at the same time characteristic for the alliance of Illyrian forests of valuable broad-leaved trees in the Illyrian floral province and differential (species) towards the alliance *Aremonio-Fagion*, as well as being characteristic for Central-European forests of valuable broad-leaved trees of the alliance *Tilio-Acerion* in the region of the Central-European province. As is evident in the synoptic table, they occur in Illyrian and Central-European forests of valuable broad-leaved trees.

The diagnostic species of the alliance *Fraxino-Acerion* are well represented in the described association; the species of the alliance *Aremonio-Fagion* also occur. This unquestionably places the association among the Illyrian forests of valuable broad-leaved trees and differentiates it from the similar stands of the alliance *Tilio-Acerion* in Central-Europe.

The community described was synsystematically classified as follows:

Querco-Fagetea Br.-Bl. et Vlieger in Vlieger 1937
Fagetalia sylvaticae Pawłowski in Pawłowski et al. 1928
Fraxino-Acerion Fukarek 1969
Dryopterido affini-Aceretum ass. nova hoc loco

As an example of Central-European stands we selected two syntaxa on silicate bedrock (Tab. 6/13, 14) which were described in Central Europe and are most similar to this association regarding the presence of the differential species of the association *Dryopterido affini-Aceretum*. Syntaxon (Tab. 6/13) comprises the stands described in southwestern Styria in Austria (Sturm 1978), i.e. in the borderline region of the Illyrian floral province, which gives the stands a transitional character. There is also a small proportion of species from the alliances *Fraxino-Acerion* and *Aremonio-Fagion* in this region. This is completely unlike the syntaxon (Tab 6/14) from Germany (Büker 1942), where all of the character species from the alliances *Fraxino-Acerion* and *Aremonio-Fagion* are missing.

4. CONCLUSION

Forests of valuable broad-leaved trees on silicate bedrock in the submontane and montane belt have been extensively researched in Slovenia. A new association *Dryopterido affini-Aceretum* has been described, classified into the alliance of Illyrian forests of valuable broad-leaved trees *Fraxino-Acerion*. In the future it will be necessary to conduct a more thorough research of the stands of valuable broad-leaved trees on silicate bedrock also in the altimontane belt. In this study, these stands were presented with only two relevés and classified temporarily in the frame of association *Dryopterido affini-Aceretum* as variant with species *Saxifraga rotundifolia*. Further investigations will reveal whether classification of these stands is suitable, or whether they should be classified into the frame of association *Lamio orvalae-Aceretum* P. Košir et Marinček 1999, which is Illyrian forest of valuable broad-leaved trees of the altimontane belt, so far described only on carbonate bedrock (P. Košir 2004).

5. POVZETEK

Gozdovi plemenitih listavcev na nekarbonatni podlagi (*Dryopterido affini-Aceretum* ass. nova hoc loco) v Sloveniji

Na nekarbonatni podlagi smo na območju ilirske florne province opisali novo asociacijo *Dryopterido affini-Aceretum*. Sestoje asociacije smo našli v submontanskem in montanskem (deloma altimontanskem) pasu na območju Pohorja in Litije v predalpskem in alpskem območju Slovenije. Na Pohorju se sestoji plemenitih listavcev pojavljajo v širšem območju razširjenosti asociacije *Cardamine savensi-Fagetum* var. *Abies alba*, kontaktna združba sestojev z območja Litije pa je *Blechno-Fagetum*.

Popisovali smo po standardni srednjeevropski metodi (Braun-Blanquet 1964), talne razmere pa smo proučili s pomočjo reprezentančnih talnih profilov. Pri obdelavi in analizi fitocenoloških popisov in njihovi sintaksonomski uvrstitvi smo si pomagali tudi z ordinacijsko metodo glavnih koordinat (PcoA) iz računalniškega paketa SYN-TAX 2000 (Podani 2001). Mera različnosti je bila komplement koeficienta »similarity ratio«. Asociacijo smo členili na nižje sintaksonomske enote po načelu večrazsežne členitve vegetacijskih enot (W. & A. Matuszkiewicz 1981).

Sestoji asociacije poraščajo strma koluvialna pobočja, vznožja pobočij, pobočja ozkih dolin pogosto nad vodotoki ter pobočja hudourniških jarkov. Prevladujejo koluvialna distrična tla, pojavljajo se tudi ranker in koluvialno-deluvialna distrična rjava tla. Tla imajo relativno visoke vrednosti kationske izmenjevalne kapacitete, v primerjavi s tlemi na karbonatni matični podlagi pa imajo manjšo vsebnost bazičnih kationov. C/N-razmerja so zaradi nižjih pH-vrednosti v splošnem manj ugodna in pomenijo biološko manj aktivna tla. Neprekinjeno biološko kroženje snovi je zagotovljeno s koluvialnostjo tal in s tem s stalnim donosom organskih snovi in vode, ki omogočajo, da mineralizacija kljub nižjim pH vrednostim poteka relativno hitro.

Razlikovalne vrste asociacije *Dryopterido affini-Aceretum* so *Dryopteris affinis*, *Luzula luzuloides*, *Dryopteris dilatata*, *Phegopteris connectilis* in *Gymnocarpium dryopteris*. Naštete vrste, ki optimalno uspevajo na kislih nekarbonatnih kamninah, označujejo zmerno acidofilni značaj asociacije in jih uvrščamo v razred *Vaccinio-Piceetea*. Vrsta *Dryopteris affinis*, po kateri ima združba ime, se v sestojih pojavlja najpogosteje in z velikimi pokrovnimi vrednostmi.

Asociacijo smo členili na dve geografski varianti: *D.-A.* var. geogr. *typica* (Litija) in *D.-A.* var. geogr. *Dentaria trifolia* (Pohorje). Ekološko pa smo asociacijo členili v tri subasociacije: *D.-A. scopolietosum carniolicae* v submontanskem pasu na najbolj kislih in najbolj vlažnih rastiščih, *D.-A. polystichetosum setiferi* v submontanskem pasu na vlažnih in najtoplejših rastiščih in subasociacijo *D.-A. leucojetosum vernae* na večjih nadmorskih višinah (montanski in delno altimontanski pas) in na manj vlažnih tleh. V okviru subasociacije *D.-A. polystichetosum setiferi* in subasociacije *D.-A. leucojetosum vernae* smo ločili tipično varianto, kjer v sestojih prevladuje *Acer pseudoplatanus*, in varianto z vrsto *Fraxinus excelsior*, kjer v drevesni plasti prevladuje *Fraxinus excelsior*. V okviru subasociacije *D.-A. leucojetosum* smo izločili še varianto z vrsto *Saxifraga rotundifolia*, ki se pojavlja v altimontanskem pasu.

Obravnavane sestoje smo v sinoptični tabeli primerjali z drugimi ilirskimi javorjevimi sestoji in sorodnimi srednjeevropskimi javorjevimi gozdovi na silikatu. Asociacijo smo uvrstili v samostojno zvezo ilirskih gozdov plemenitih listavcev *Fraxino Acerion* Fukarek 1969.

6. ACKNOWLEDGMENT

This article is part of a doctorial dissertation which comprises research on forests of valuable broad-leaved trees of the wider region of the Illyrian floral province. I would like to thank my supervisors prof. dr. Joso Vukelić, dr. Andraž Čarni, and dr. Lojze Marinček, for their valuable advices and help in developing of the thesis. I would also like to thank Milan Kosi, B. Eng., who helped with the field work. The soil profiles were described by Tomaž Prus, M. Sc., to whom I am most grateful. The chemical analyses were made in the laboratories of the Pedology and Environment Protection Centre at the Biotechnical Faculty. Finally, I would like to thank Marjan Jarnjak for his help in preparing the map of the relevé locations.

7. REFERENCES

Accetto, M. (1991): *Corydalido ochroleucae-Aceretum* ass. nova v Sloveniji. Razprave IV. razr. SAZU 32 (3): 89–128.

Borhidi, A & Kevey, B. (1996): An annoted checklist of the Hungarian plant communities II. The forest communities. In: Bohridi, A. (ed.): Criti-

cal revision of the Hungarian plant communities. Pecs, Hungary, Janus Pannonius University, pp. 95–138.
Borhidi, A. (2003): Magyarország növénytársulásai. Akademiai Kiadó, Budapest, 610 pp.
Braun-Blanquet, J. (1964): Pflanzensoziologie. Grundzüge der Vegetationskunde. Wien, New York, 865 pp.
Büker, R. (1942): Beiträge zur Vegetationskunde des südwestfälischen Berglandes. Beih. Bot. Zentralbl., 61(B): 452–558.
Chytrý, M., Tichý, L., Holt, J. & Botta-Dukát, Z. (2002): Determination of diagnostic species with statistical fidelity measures. Journal of Vegetation Science, 13: 79–90.
Clot, F. (1990): Les érablaies européennes: essai de synthèse. Phytocoenologia, 18 (4): 409–564.
Dakskobler, I. (1999): Gozdna vegetacija Zelenega potoka v dolini Idrije (zahodna Slovenija). Razprave IV razreda SAZU, 40 (7): 103–194.
Dierschke, H. (1994): Pflanzensoziologie. Grundlagen und Methoden. Stuttgart, Verlag Eugen Ulmer, 683 pp.
Ehrendorfer, F. (ed.) (1973): Liste der Gefäßpflanzen Mitteleuropas. 2. Auflage. Stuttgart, Gustav Fischer Verlag, 318 pp.
Fukarek, P. 1969. Prilog poznavanju biljnosocioloških odnosa šuma i šibljaka nacionalnog parka Sutjeska. Sarajevo, ANU BiH, posebna izdanja-XI., Odjelenje prirodnih i matematičkih nauka, knjiga 3: 189–291.
Glavač, V. (1958): O šumi lipe i tise (*Tilieto-Taxetum*). Šumarski list, 1–2: 21–26.
Hennekens, S. M. & Schaminée, J. H. J. (2001): TURBOVEG, a comprehensive data base management system for vegetation data. JVS, 12 (4): 589–591.
Horvat, I. (1938): Biljnosociološka istraživanja šuma u Hrvatskoj. (Pflanzensoziologische Walduntersuchungen in Kroatien.). Glasnik za šumske poskuse, 6: 127–256.
Horvat, I. (1962): Vegetacija planina zapadne Hrvatske sa 4 karte biljnih zajednica sekcije Sušak. Prirodoslovna istraživanja, 30, Acta Biologica II, Zagreb.
Horvat, I., Glavač, V. & Ellenberg, H. (1974): Vegetation Südevropas. Stuttgart, Gustav Fischer Verlag, 768 pp.
Jovanović, B., Lakušić, R., Rizovski, R., Trinajstić, I. & Zupančič, M. (ed.) (1986): Prodromus Phytocoenosum Jugoslaviae ad mappam vegetationis m 1: 200 000. Bribir-Ilok, pp. 1–46.
Kevey, B. (1985): Fragmentális szurdokerdők a Villány-Hegységben. Janus P. Múz. Évk., 29: 23–28.
Kevey, B. (1993): A Keleti-Mecsek szurdokerdei (*Scutellario-Aceretum*). Folia comloensis, 5: 29–54.
Kevey, B. (1997): A Nyugati-Mecsek szurdokerdei [*Scutellario altissimae-Aceretum* (Horvát, A. O. 1958) Soó et Borhidi in Soó 1962]. In: Borhidi, A. & Szabó, L. Gy (ed.): Studia Phytologica Jubilaria. Dissertationes in honorem jubilantis Adolf Olivér Horvát Doctor Academiae in annoversario nonagesimo nativitatis 1907–1997. Pécs, pp. 75–99.
Kevey, B. & Borhidi, A. (1998): Top-forest (*Aconito anthorae-Fraxinetum orni*) a special ecotonal case in the phytosociological system (Mecsek mts, south Hungary). Acta Bot. Hung., 41 (1–4): 27–121.
Košir, P. & Marinček, L. (1999): Predhodno poročilo o raziskavah javorjevih gozdov v Sloveniji. ABS, 42 (3): 53–58.
Košir, P. (2000): Javorjevi gozdovi gorskega sveta zahodnega dela ilirske florne province. Magistrsko delo, Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 104 pp.
Košir, P. (2002): Prispevek k sinsistematiki združbe *Hacquetio-Fraxinetum excelsioris* Marinček in Wallnöfer et al. 1993. Hacquetia, 1 (1): 109–128.
Košir, P. (2004): Sinsistematski pregled šuma plemenitih listača ilirske florne provincije s posebnim osvrtom na zajednice u Sloveniji. Doktorska disertacija, Sveučilište u Zagrebu, Šumarski fakultet, Zagreb.
Košir, Ž. (1979): Ekološke, fitocenološke in gozdnogospodarske lastnosti Gorjancev v sloveniji. Zb. gozdarstva in lesarstva, 17 (1): 1–242.
Košir, Ž. (1994): Ekološke in fitocenološke razmere v gorskem in hribovitem jugozahodnem obrobju Panonije. Zveza gozdarskih društev Slovenije, Ljubljana, 149 pp.
Kramer, K. U. (ed.) (1984): Illustrierte Flora von Mitteleuropa. Gustav Hegi. Band I. Teil 1. Pterydophyta. Berlin, Hamburg, Verlag Paul Parey, 309 pp.
Lasen, C. & Urbinati, C. (1995): Typology and ecology of maple-linden and maple-ash forest communities: Preliminary considerations in northeastern Italian Prealpine ranges. Sauteria, 6: 21–56.
Marinček, L. (1990): Beitrag zur Kenntnis der Edellaubwälder Illyriens. In: Illyrische Einstrahlungen im ostalpin-dinarischen Raum, Symposium in Keszthely. 25–29. junij 1990, Pannon Agrauniversität, Fakultät Georgikon Keszthely, pp. 51–58.

Marinček, L., Mucina, L., Zupančič, M., Poldini, L., Dakskobler, I. & Accetto, M. (1993): Nomenklatorische Revision der Illyrischen Büchenwälder (Verband *Aremonio-Fagion*). Studia Geobotanica, 12: 121–135.

Marinček, L. (1994): Contribution to demarcation and phytogeographic division of the Illyrian floral province, based on vegetation and flora. Gortania, 16: 99–124.

Marinček, L. (1995a): Prispevek k poznavanju gozdov plemenitih listavcev v Sloveniji. Biol. vestn., 40 (3–4): 87–99.

Marinček, L. (1995b): Urwald Šumik in Slowenien. Sauteria, 6: 57–74.

Marinček, L. & Čarni, A. (2000): Die Unterverbände der Hainbuchenwälder des *Verbandes Erythronio-Carpinion betuli* (Horvat 1938) Marinček in Wallnöfer, Mucina et Grass 1993. Scopolia, 45: 1–20.

Martinčič, A. (2003): Seznam listnatih mahov (*Bryopsida*) Slovenije. Hacquetia, 2 (1): 91–166.

Martinčič, A., Wraber, T., Jogan, N., Ravnik, V., Podobnik, A., Turk, B. & Vreš, B. (1999): Mala flora Slovenije. Ključ za določanje praprotnic in semenk. Tehnična založba Slovenije, 845 pp.

Matuszkiewicz, W. & Matuszkiewicz, A. (1981): Das prinzip der mehrdimensionalen Gliederung der vegetations-Einheiten, erläutert am Beispiel der Eichen-Hainbuchenwälder in Polen. In: H. Dierschke (ed.): Berichte der Syntaxonomie. J. Cramer, Vaduz, pp. 123–148.

Müller, T. (1992): Verband: *Tilio platyphyllis-Acerion pseudoplatani* Klika 55. In: Oberdorfer, E. (ed.): Süddeutsche Pflanzengesellschaften. Wälder und Gebüsche. Jena, Gustav Fischer Verlag, pp. 173–192.

Oberdorfer, E. 1994. Pflanzensoziologische Exkursionsflora.7 Auflage. Stuttgart, Verlag Eugen Ulmer, 1050 pp.

Ogrin, D. (1996): Podnebni tipi v Sloveniji. Geografski vestnik, Ljubljana, 68: 39–56.

Petračić, A. & Anić, M. (1952): Obični jasen (*Fraxinus excelsior*) u Zagrebačkoj gori. Glasnik za šumske poskuse, 10: 25–62.

Pignatti, S. (1982): Flora d'Italia. 1.2.3. Bologna.

Podani, J. (2001): SYN-TAX 2000. Computer programs for data analysis in ecology and systematics. Budapest, 53 pp.

Poldini L. (1991): Atlante chorologico delle pinate vascolari nel Friuli-Venezia Giulia. Università degli studi di Trieste dipartimento di Biologia, Udine, 899 pp.

Poldini, L. & Nardini, S. (1993): Boschi di forra, faggete e abieteti in Friuli (NE Italia). Studia geobotanica, 13: 215–298.

Slovenija. Geološka karta 1: 500 000. Geodetski zavod Slovenije, 1993.

Stefanović, V. (1986): Fitocenologija sa pregledom šumskih fitocenoza Jugoslavije, »Svjetlost«, OOUR Zavod za udžbenike i nastavna sredstva, Sarajevo, 269 pp.

Sturm, M. (1978): Pflanzensociologische Untersuchungen an Wäldern und Wiesen in der Südweststeiermark. Dissertation zur Erlangung des Doktorgrades an der Formal- und Naturwissenschaftlichen Fakultät der Universität Wien.

Tichý, L. (2001): JUICE, software for vegetation classification. Journal of Vegetation Science, 13: 451–453.

Vukelić, J. & Rauš, Đ. (1998): Šumarska fitocenologija i šumske zajednice u Hrvatskoj. Sveučilište u Zagrebu, Zagreb, 310 pp.

Wallnöfer, S., Mucina, L. & Grass, V. (1993): *Querco-Fagetea*. In: L. Mucina, G. Grabherr and S. Wallnöfer (ed.): Die Pflanzengesellschaften Österreichs. Teil III. Jena, Stuttgart, New York, Gustav Fischer Verlag.

Weber, H. E., Moravec, J. & Theurillat, J.-P. (2000): International Code for Phytosociological Nomenclature. Journal of Vegetation Science, 11: 739–768.

Wraber, M. (1953): Tipološka podoba vegetacije višjih predelov Pohorja. (Die wichtigsten Vegetationstypen der höheren Lagen von Pohorje.). Biol. vestn., 2: 89–109.

Wraber, M. (1960): Fitosociološka razčlenitev gozdne vegetacije v Sloveniji. (Pflanzensoziologische Gliederung der Waldvegetation in Slovenien.). Ad Annum Horti Bot. labacensis Solemnem, pp. 49–96.

Zupan, M., Grčman, H. & Kočevar, H. (1998): Navodila za vaje iz Pedologije (za interno uporabo). Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za Agronomijo, Ljubljana, 62 pp.

Zupančič, M., Marinček, L., Seliškar, A. & Puncer, I. (1987): Consideration on the phytogeographic division of Slovenia. Biogeographia, XIII: 89–98.

Zupančič, M. (1996): European maple association in Slovenia (*Corydalido cavae-Aceretum pseudoplatani* Moor 1938). Razprave IV. razr. SAZU, 37 (8): 189–205.

Zupančič, M. (1999): Smrekovi gozdovi Slovenije. Dela IV razreda SAZU 36, Ljubljana, 222 pp.

Zupančič, M. & Žagar, V. (1999): Asociacija *Arunco-Aceretum* Moor 1952 v severovzhodni Sloveniji. Razprave IV razreda SAZU, 40 (9): 315–361.

Figure 5: Soil profiles in the association *Dryopterido affini-Aceretum* (from left to right: dystric brown soil-colluvial, dystrict leptosol, colluvial-delluvial dystric soil).
Slika 5: Tla v asociaciji *Dryopterido affini-Aceretum* (od leve proti desni: koluvialna distrična rjava tla, ranker, koluvialno-deluvialna distrična tla).

Figure 6: *Dryopterido affini-Aceretum polystichetosum setiferi* v začetku junija
Slika 6: *Dryopterido affini-Aceretum polystichetosum setiferi* v začetku junija

8. APPENDIX

Appendix to table 5:

Relevé locations: **1.** Litija, ravine under Špik, **2.** Litija, Breg near Litija, **3.** Litija, Breg near Litija, **4.** Litija, ravine under Špik **5.** Litija, ravine under Špik, **6.** Litija, ravine under Špik, **7.** Litija, ravine under Špik, **8.** Pohorje, along the stream Lobničica above Ruše, **9.** Pohorje, along the stream Lobničica above Ruše, **10.** Pohorje, valley of Lobnica, **11.** Pohorje, along the stream Lobničica above Ruše, **12.** Pohorje, valley of Lobnica, **13.** Pohorje, from Ruška koča towards Ruše, **14.** Pohorje, valley of Lobnica, **15.** Pohorje, valley of Lobnica, **16.** Pohorje, from Ruška koča towards Ruše, **17.** Pohorje, valley of Lobnica, **18.** Pohorje, valley of Lobnica, **19.** Pohorje, valley of Lobnica, **20.** Pohorje, along the stream Lobničica above Ruše, **21.** Pohorje, Fram Ranče, **22.** Pohorje, Fram Ranče, **23.** Pohorje, Fram Ranče, **24.** Pohorje, Fram Ranče, **25.** Pohorje, Fram Ranče, **26.** Pohorje, above Bistrica ob Dravi, **27.** Pohorje, from Ribnica on Pohorje towards Rogla, **28.** Pohorje, Šumik virgin forest, **29.** Pohorje, Šumik virgin forest, **30.** Pohorje, from Ribnica on Pohorje towards Rogla **31.** Marinček (1995b), *Acer pseudoplatanus-Ulmus glabra* (nom. prov.), table 3, relevé no. 1, Šumik, **32.** Pohorje, Šumik virgin forest, **33.** Pohorje, Šumik virgin forest**, 34.** Pohorje, Šumik virgin forest, **35.** Marinček (1995b), *Acer pseudoplatanus-Ulmus glabra* (nom. prov.), table 3, relevé no. 2, Šumik, **36.** Pohorje, Ribnica on Pohorje, **37.** Pohorje, Ribnica on Pohorje.

The species occurring only once in the Table (rare species): **FA;** *Tilia platyphyllos* Ia 23 (+), *Phyllitis scolopendrium* III 33 (+), **F;** *Pulmonaria stiriaca* III 1 (+), *Prunus avium* Ia 15 (+), *Euphorbia amygdaloides* III 27 (+), *Galium schultesii* III 30 (+), *Epipactis helleborine* III 36 (+), **QF;** *Hypericum montanum* III 10 (+), *Hepatica nobilis* III 17 (+), *Melica nutans* III 17 (+), *Betonica officinalis* III 33 (+), *Polygonatum odoratum* III 36 (+), **AU;** *Myosotis scorpioides* III 1 (+), *Carex pendula* III 4 (+), *Caltha palustris* III 14 (+), *Equisetum arvense* III 16 (+), *Lysimachia nemorum* III 16 (+), *Crepis paludosa* III 19 (+), *Cardamine impatiens* III 22 (+), *Geranium phaeum* III 23 (+), *Listera ovata* III 36 (+), **VP;** *Galium rotundifolium* III 29 (+), *Avenella flexuosa* III 32 (+), *Hieracium lachenalii* III 32 (+), *Lonicera nigra* II 37 (+), *Lonicera nigra* III 37 (+), **A;** *Aconytum vulparia* III 36 (+), **O;** *Eupathorium cannabinum* III 1 (r), *Pseudotsuga menziensii* Ia 5 (1), *Prunella vulgaris* III 10 (r), *Carex divulsa* III 12 (+), *Cirsium erisithales* III 12 (+), *Pteridium aquilinum* III 13 (+), *Poa trivialis* III 15 (+), *Galium aparine* III 23 (+), *Betula pendula* Ib 32 (+), *Fragaria vesca* III 32 (+), **M;** *Polytrichum commune* IV 1 (+), *Mnium hornum* IV 2 (+), *Pseudotaxiphyllum elegans* IV 4 (+), *Plagiothecium laetum* IV 5 (+), *Bazzania trilobata* IV 7 (+), *Brachythecium campestre* IV 13 (+), *Eurhynchium striatum* IV 14 (+), *Rhynchostegium rotundifolium* IV 16 (+), *Brachythecium velutinum* IV 21 (+), *Fissidens taxifolius* IV 21 (+), *Rhytidiadelphus triquetrus* IV 26 (+), *Apometzgeria pubescens* IV 30 (+), *Hypnum cupressiforme* var. *filiforme* IV 30 (+), *Isothecium myosuroides* IV 30 (+), *Eurhynchium schleicheri* IV 31 (+), *Bartramia halleriana* IV 35 (+), *Ptilium crista-castrensis* IV 35 (+), *Brachythecium reflexum* IV 36 (+).

Recieved 19. 11. 2004
Revision recieved 27. 12. 2004
Accepted 20. 1. 2005

Table 5: Analytic table of the association *Dryopterido affini-Aceretum* ass. nova hoc loco
Tabela 5: Analitična tabela asociacije *Dryopterido affini-Aceretum* ass. nova hoc loco

Relevé number			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Date:	day		15	24	24	5	5	5	5	11	11	22	11	3	22	3	3	22	22	22
	month		5	5	5	5	5	5	5	6	6	5	6	6	5	6	6	5	5	5
	year		2000	2000	2000	2000	2000	2000	2000	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002	2002
Relevé area (m2)			200	300	400	200	300	200	400	400	400	300	400	200	200	300	200	200	400	400
Altitude (m)			435	275	280	330	350	310	320	400	410	690	400	410	780	430	435	730	610	480
Aspect			NE	E	E	E	SW	NE	NE	E	E	E	W	S	EES	EES	S	SE	E	E
Slope (degrees)			30	30	25	25	30	5	30	30	45	30	40	35	15	5	40	25	40	40
Cover bare rock (%)			0	30	0	0	0	0	0	10	5	20	0	0	20	5	0	5	30	5
Cover of separate layers (%):																				
Upper tree layer		Ia	60	80	60	70	80	60	80	80	85	70	70	80	75	90	80	90	70	70
Lower tree layer		Ib	5	5	20	30	50	10	20	40	20	10	40	50	40	40	50	50	50	20
Shrub layer		II	5	30	20	5	20	5	5	40	40	5	10	30	10	60	20	10	25	20
Herb layer		III	90	90	100	80	80	100	100	100	90	100	90	80	80	90	60	80	100	100
Moss layer		IV	5	10	5	5	5	0	20	5	5	10	10	0	10	60	0	5	20	0
			var. geogr.*typica*																	
			scopolietosum carniolicae (a)							*polystichetosum setiferi* (b)										
										var. *typica*			var. *Fraxinus excelsior*							
DIFFERENTIAL SPECIES OF THE ASSOCIATION																				
VP	*Dryopteris affinis*	III	1	1	1	1	2	+	1	+	1	2	3	1	+	+	+	1	1	2
VP	*Dryopteris dilatata*	III	+	+	.	+	+	+	+	.	.	.	.	.	.	+	.	.	+	.
VP	*Luzula luzuloides*	III	.	.	+	+	+	+	+	.	.	.	.	+	.	.	+	.	+	+
VP	*Phegopteris connectilis*	III	+	+	.	+	.	.	+	.	.	.	+	.	.	.	.	.	+	.
VP	*Gymnocarpium dryopteris*	III	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
DIFFERENTIAL SPECIES OF GEOGRAPHICAL RACE																				
AF	*Dentaria trifolia*	III	.	.	.	.	.	.	.	.	.	1	1	.	.	1	+	.	+	.
VP	*Abies alba*	Ia	.	.	.	.	.	.	.	.	.	.	1	.	.	1	.	.	.	.
VP	*Abies alba*	Ib	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+
VP	*Abies alba*	II	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
VP	*Abies alba*	III	.	.	.	.	.	.	.	+	+	+	1	.	+	.	.	+	+	+
VP	*Hieracium transsylvanicum*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
DIFFERENTIAL SPECIES OF SUBASS. AND. VAR.																				
FA	*Scopolia carniolica*	III	3	3	3	3	1	3	4	.	.	.	.	.	.	.	.	.	.	.
VP	*Blechnum spicant*	III	r	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	*Alnus glutinosa*	Ia	2	1	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	*Alnus glutinosa*	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	*Alnus glutinosa*	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	*Cardamine amara*	III	1	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	*Equisetum pratense*	III	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.
FA	*Polystichum setiferum*	III	.	.	.	.	.	.	.	2	1	+	1	2	+	+	3	+	1	1
FA	*Polystichum x bicknellii*	III	.	.	.	.	.	.	.	1	2	.	2	.	+	.	.	.	+	+
FA	*Polystichum x wirtgenii*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.
QF	*Aegopodium podagraria*	III	.	.	.	.	.	.	.	1	+	+	2	3	2	1	+	2	.	.
QF	*Brachypodium sylvaticum*	III	.	.	.	.	.	.	.	+	+	.	+	1	1	+	+	+	.	.
FA	*Glechoma hirsuta*	III	.	.	.	.	.	.	.	+	.	1	+	1	.	+	.	.	.	.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
3	11	29	29	29	29	29	11	14	21	21	14		21	21	21		14	14
6	6	5	5	5	5	5	7	6	5	5	6		5	5	5		6	6
2002	2002	2002	2002	2002	2002	2002	2003	2002	2002	2002	2002		2002	2002	2002		2002	2002
400	200	400	400	200	400	200	400	400	400	400	400		400	400	200		400	400
400	405	780	800	690	790	800	910	890	950	950	850	890	980	830	755	850	1160	1210
NE	EEN	NE	NE	NE	NE	NE	NNW	N	NW	NW	E	E	NNW	NW	NE	E	NE	NNE
35	10	30	30	5	35	35	25	35	15	20	35	20	60	30	30	20	20	20
35	0	0	0	0	0	0	10	5	20	10	40	15	80	5	10	30	10	60
70	70	80	60	90	75	75	90	90	90	70	90	70	40	70	70	70	70	60
60	60	10	20	20	40	20	10	30	10	5	20	0	20	0	10	0	30	20
15	30	20	30	10	60	30	5	10	5	5	10	2	10	5	10	50	5	5
70	75	90	100	100	90	100	80	90	80	90	70	60	30	100	90	60	90	70
20	5	0	0	0	1	0	5	5	10	5	30	5	70	20	5	10	5	20

var. geogr. *Dentaria trifolia*																		
	leucojetosum vernae (c)																	
	var. *Fraxinus exc.*						var. *typica*										var. Sax. Rot.	
2	+	1	1	1	1	1	1	2	.	.	1	.	.	2	1	.	.	.
.	.	.	.	+	.	.	.	+	+	+	+	+	+	+	.	+	+	2
+	.	+	+	.	+	+	.	.	.	.	.	.	1	.	.	.	+	+
+	+	.	.	.	+	+	.	.	.	.	+	1	+	+	.	+	.	2
1	+	+	+	.	1	.	.	+	.	+	.	+	1	.	.	.	.	+
.	2	1	1	2	1	1	1	1	+	+	1	1	.	.	+	+	+	2
+	.	.	.	.	+	.	.	.	.	.	.	+	+	.	+	.	+	.
.	1	.	+	.	.	+	+	.	.	.	+	.	.	.	.	.	.	.
.	+	+	.	.	+	.	.	.	.	.	+	.	+	.	.	.	.	.
.	.	.	.	.	.	.	+	+	+	.	+	+	+	.	.	.	.	.
+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
+	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

presence	frequency	presence (a)	frequency (a)	presence (b)	frequency (b)	presence (c)	frequency (c)
30	81	7	100	13	100	10	59
19	51	6	86	2	15	11	65
17	46	5	71	5	38	7	41
16	43	4	57	4	31	8	47
11	30	.	.	3	23	8	47
21	57	.	.	6	46	15	88
8	22	.	.	3	23	5	29
8	22	.	.	4	31	4	24
6	16	.	.	2	15	4	24
14	38	.	.	8	62	6	35
2	5	.	.	2	15	.	.
7	19	7	100	.	.	.	.
5	14	5	71	.	.	.	.
4	11	4	57	.	.	.	.
1	3	.	.	.	.	1	6
1	3	.	.	.	.	1	6
3	8	3	43	.	.	.	.
2	5	2	29	.	.	.	.
13	35	.	.	13	100	.	.
6	16	.	.	6	46	.	.
1	3	.	.	1	8	.	.
10	27	.	.	9	69	1	6
10	27	.	.	9	69	1	6
5	14	.	.	5	38	.	.

	Relevé number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
F	*Paris quadrifolia*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F	*Leucojum vernum*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
VP	*Calamagrostis arundinacea*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+
A	*Polygonatum verticillatum*	III	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
F	*Dentaria bulbifera*	III	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
F	*Festuca altissima*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FA	*Fraxinus excelsior*	Ia	.	.	.	.	.	.	.	.	.	.	3	4	4	5	5	4	4	4
FA	*Fraxinus excelsior*	Ib	.	.	.	.	.	.	.	1	.	.	1	1	1	1	+	+	+	1
FA	*Fraxinus excelsior*	II	.	.	.	.	.	.	.	1	2	.	.	.	+	1	+	.	+	1
FA	*Fraxinus excelsior*	III	.	.	.	.	.	.	.	+	.	+	+	.	1	+	.	.	.	.
A	*Saxifraga rotundifolia*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
A	*Cicerbita alpina*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
A	*Ribes petraeum*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
A	*Viola biflora*	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
FA	***FRAXINO-ACERION***																			
	Acer pseudoplatanus	Ia	2	4	3	3	3	3	4	5	5	4	+	1	+	+	.	2	+	.
	Acer pseudoplatanus	Ib	.	+	.	.	+	+	+	+	+	+	+	.	.	+	1	3	.	.
	Acer pseudoplatanus	II	+	+	+	+	.	+	+	.	+	.	+	.	.	1	.	.	.	+
	Acer pseudoplatanus	III	+	.	.	+	+	.	+	1	1	1	.	+	+	+	+	+	.	.
	Stellaria montana	III	+	1	1	1	+	2	1	+	1	+	1	+	1	+	+	2	1	.
	Urtica dioica	III	+	+	+	.	+	+	+	+	1	1	+	1	1	+	+	1	2	1
	Adoxa moschatellina	III	.	.	+	.	.	.	+	+	+	+	1	+	.	1	+	.	+	+
	Ulmus glabra	Ia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
	Ulmus glabra	Ib	.	.	.	.	.	.	.	2	1	+	.	.	.	2	.	.	+	1
	Ulmus glabra	II	.	+	.	.	.	.	.	2	1	+	+	1	+	1	+	+	+	+
	Ulmus glabra	III	.	.	.	.	.	.	.	+	+	.	+	.	.	.	+	.	.	.
	Sambucus nigra	Ib	.	.	.	.	.	.	.	+	.	+	.	+	.	+	.	.	.	.
	Sambucus nigra	II	+	+	+	.	.	+	+	+	+	+	+	.	.	+	.	+	+	1
	Sambucus nigra	III	r	.	.	+	.	.	.	.	+	.	+	.	+	.	.	+	+	.
	Doronicum austriacum	III	+	1	+	+	.	+	+	.	.	.	.	.	.	+	.	.	+	.
	Geranium robertianum	III	+	.	.	.	.	.	.	+	+	.	+	+	+	.	+	+	+	+
	Circaea lutetiana	III	+	+	.	.	+	+	.	1	1	+	1	2	+	.	+	+	+	1
	Actaea spicata	III	.	+	.	.	.	.	.	.	+	.	+	.	+	.	+	.	+	.
	Aruncus dioicus	III	.	.	+	.	.	.	.	+	+	.	.	+	.	+	.	.	.	1
	Polystichum braunii	III	.	1	.	+	.	.	1	+	1	+	+	.	.	+	.	.	+	.
	Lunaria rediviva	III	.	.	.	.	.	.	.	3	3	4	+	.	.	2	.	.	.	5
	Polystichum aculeatum	III	.	.	.	.	.	.	.	.	+	.	+	.	.	.	+	.	.	1
	Lamium orvala	III	.	+	+	.	3	1	.	3	2	.	.	.	.	1	.	.	.	.
	Isopyrum thalictroides	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
	Geum urbanum	III	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.
	Circaea alpina	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Circaea x intermedia	III	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.
	Polystichum x luerssenii	III	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.
F	***FAGETALIA SYLVATICAE***																			
	Petasites albus	III	3	+	+	1	1	.	+	2	2	3	3	+	2	3	+	1	3	+
	Symphytum tuberosum	III	.	1	.	+	+	+	1	.	.	+	.	.	+	+	.	+	+	.
	Dryopteris filix-mas	III	.	+	+	.	+	.	.	.	.	+	.	+	2	.	1	1	.	+
	Mercurialis perennis	III	.	.	.	.	.	.	.	.	.	1	+	.	+	2	.	.	+	.
	Asarum europaeum	III	.	.	+	+	.	+	.	1	+	+	+	.	+	+	.	+	+	+
	Carex sylvatica	III	+	.	+	+	+	+	.	1	+	+	1	+	+	1	2	+	+	.
	Fagus sylvatica	Ia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Fagus sylvatica	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37								
.	.	+	.	+	+	+	+	+	+	+	+	+	+	.	+	.	.	+	13	35	.	.	.	.	13	76
.	.	+	+	+	r	.	+	.	1	+	.	.	.	1	.	.	+	2	11	30	.	.	1	8	10	59
.	.	+	+	.	.	+	.	.	.	.	1	+	.	.	.	+	+	1	10	27	.	.	2	15	8	47
.	.	+	+	+	+	+	+	+	.	.	.	.	.	.	.	.	+	+	10	27	.	.	1	8	9	53
.	.	.	+	.	.	.	+	+	+	+	.	.	.	.	.	.	+	.	7	19	.	.	1	8	6	35
.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	+	.	4	11	.	.	.	.	4	24
4	3	4	3	5	4	3	.	.	.	.	.	.	.	.	.	.	.	.	15	41	.	.	10	77	5	29
3	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12	32	.	.	11	85	1	6
1	2	1	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	12	32	.	.	9	69	3	18
+	1	+	+	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	11	30	.	.	7	54	4	24
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	2	5	.	.	.	.	2	12
.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	3	.	.	.	.	1	6
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	3	.	.	.	.	1	6
.	3	2	3	.	.	2	5	5	3	3	4	3	2	3	3	1	4	3	32	86	7	100	10	77	15	88
1	1	1	2	.	3	2	+	+	+	+	+	.	+	.	+	.	2	+	26	70	4	57	9	69	13	76
.	+	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	.	13	35	6	86	5	38	2	12
+	+	+	.	.	+	+	+	+	+	+	1	.	+	+	.	+	+	+	27	73	4	57	10	77	13	76
+	+	+	2	1	2	1	+	2	+	+	1	+	+	1	.	1	1	.	34	92	7	100	12	92	15	88
.	+	.	.	.	.	.	1	1	2	3	+	1	2	3	2	3	.	+	29	78	6	86	12	92	11	65
.	2	+	+	1	+	1	+	+	+	+	+	1	+	1	.	3	+	1	28	76	2	29	10	77	16	94
+	.	.	.	.	.	.	.	.	.	+	+	+	.	.	1	2	.	.	7	19	.	.	2	15	5	29
+	.	.	.	+	.	.	.	2	.	.	.	.	.	.	.	.	.	.	9	24	.	.	7	54	2	12
+	1	.	.	+	.	.	.	+	.	.	+	.	+	+	+	.	.	.	20	54	1	14	13	100	6	35
.	1	+	.	.	.	.	+	+	.	+	+	.	.	.	.	.	.	.	10	27	.	.	5	38	5	29
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	11	.	.	4	31	.	.
+	.	.	.	+	.	.	.	+	+	.	.	+	.	.	+	+	.	.	20	54	5	71	9	69	6	35
.	+	.	.	+	.	.	+	.	.	.	+	.	.	.	.	.	.	.	11	30	2	29	6	46	3	18
2	.	+	1	+	1	1	+	.	.	.	+	+	+	.	.	+	+	+	21	57	6	86	3	23	12	71
.	.	.	.	.	.	.	+	+	+	+	+	+	+	1	+	+	.	.	20	54	1	14	9	69	10	59
+	1	.	.	.	.	.	.	.	.	+	+	.	.	1	.	.	.	.	19	51	4	57	12	92	3	18
+	+	+	1	+	1	1	+	+	.	.	.	.	+	.	+	.	1	+	19	51	1	14	7	54	11	65
+	.	+	+	+	+	+	.	+	.	.	+	+	.	.	.	+	+	.	17	46	1	14	6	46	10	59
+	.	.	.	+	.	.	.	.	.	.	1	.	1	.	1	.	+	+	16	43	3	43	7	54	6	35
2	4	.	.	.	.	.	.	3	.	.	+	.	.	.	+	.	2	.	12	32	.	.	8	62	4	24
2	.	.	.	.	.	.	+	+	.	.	2	+	.	1	+	.	+	.	12	32	.	.	5	38	7	41
2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8	22	4	57	4	31	.	.
.	.	.	.	2	.	.	.	.	1	+	.	.	+	.	.	.	.	.	5	14	.	.	1	8	4	24
.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	4	11	.	.	2	15	2	12
.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	3	8	.	.	.	.	3	18
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	1	14	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	2	5	.	.	1	8	1	6
1	2	3	2	+	2	+	2	3	.	1	2	3	+	3	3	+	4	3	35	95	6	86	13	100	16	94
+	+	+	+	1	+	+	1	+	.	+	+	+	.	1	+	+	1	+	27	73	5	71	7	54	15	88
.	.	1	1	+	2	2	2	3	.	+	1	+	+	.	.	.	2	+	22	59	3	43	6	46	13	76
2	.	2	2	1	2	1	2	+	+	+	2	+	.	+	.	1	2	.	20	54	.	.	6	46	14	82
2	1	.	+	+	.	+	.	.	.	.	.	+	.	+	+	.	.	.	20	54	3	43	11	85	6	35
+	+	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	19	51	5	71	12	92	2	12
.	+	.	.	.	.	.	+	.	2	+	.	1	.	1	.	.	.	.	6	16	.	.	1	8	5	29
.	.	.	.	.	+	.	+	.	+	.	1	.	.	.	+	.	.	.	5	14	.	.	.	.	5	29

	Relevé number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Fagus sylvatica	II	.	+	+	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.
	Fagus sylvatica	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+
	Galium odoratum	III	.	.	.	.	.	.	.	+	+	+	1	+	2	.	1	+	+	2
	Carpinus betulus	Ia	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
	Carpinus betulus	Ib	+	+	1	2	2	+	+	.	+	.	1	2	.	+	3	.	.	.
	Carpinus betulus	II	.	.	.	.	1	.	.	.	.	.	.	+	.	.	+	.	.	.
	Carpinus betulus	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Lamiastrum flavidum	III	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	+	+	.
	Salvia glutinosa	III	.	.	.	.	.	+	.	.	.	+	2	+	2	.	+	+	+	+
	Mycelis muralis	III	.	.	.	.	.	.	.	.	+	r	+	.	+	.	+	+	.	.
	Corydalis solida	III	.	.	.	.	.	.	.	+	+	r	+	.	+	+	.	.	.	.
	Viola reichenbachiana	III	.	.	.	+	.	+	.	.	.	r	+	+	+	+	+	+	+	+
	Sanicula europaea	III	.	.	+	.	.	.	.	.	+	+	+	.	+	.	+	+	.	+
	Prenanthes purpurea	III	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
	Pulmonaria officinalis	III	.	.	+	+	+	.	.	.	.	+	+	.	.	.	.	.	+	.
	Epilobium montanum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.
	Lamiastrum montanum	III	1	+	+	+	1	1	1	.	.	.	.	.	.	.	.	.	.	.
	Scrophularia nodosa	III	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	+
	Daphne mezereum	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Daphne mezereum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Poa nemoralis	III	.	.	.	.	.	.	.	.	.	r	.	.	+	.	.	.	.	+
	Phyteuma spicatum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Milium effusum	III	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	1	.
	Heracleum sphondylium	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
	Corydalis cava	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
	Ranunculus lanuginosus	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+
	Campanula trachelium	III	.	.	.	.	.	.	.	.	.	.	.	1	+	.	2	.	.	.
	Polygonatum multiflorum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Lilium martagon	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
QF	***QUERCO-FAGETEA***																			
	Anemone nemorosa	III	.	+	1	+	.	+	+	+	r	+	.	.	.	1	.	+	+	.
	Corylus avellana	Ib	.	.	.	.	.	.	.	.	.	+	.	+	1	.	.	.	2	.
	Corylus avellana	II	.	1	1	+	.	.	+	.	.	+	+	1	+	+	+	.	.	.
	Corylus avellana	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Castanea sativa	Ia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Castanea sativa	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
	Castanea sativa	II	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.
	Castanea sativa	III	.	.	.	.	.	.	.	.	.	.	.	+	r	.	+	+	.	.
	Moehringia trinervia	III	.	.	.	.	+	.	.	.	.	+	.	1	.	.	+	.	.	+
	Hedera helix	III	r	.	.	.	.	.	.	.	.	.	+	+	.	.	+	.	.	.
	Carex digitata	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
	Campanula persicifolia	III	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+
	Clematis vitalba	III	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
	Lathraea squamaria	III	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	.	.
	Cruciata glabra	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.
	Cardaminopsis halleri	III	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	+	.	.
	Ranunculus ficaria	III	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.
	Digitalis grandiflora	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
	Veronica officinalis	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
	Quercus petraea	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AF	***AREMONIO-FAGION* s. lat.**																			
	Cardamine trifolia	III	1	2	1	1	.	1	1	+	.	+	+	.	.	2	.	.	.	.
	Knautia drymeia	III	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	+	.	.
	Euphorbia carniolica	III	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37								
.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	16	2	29	2	15	2	12
.	.	.	.	.	.	.	+	.	+	+	+	+	+	.	.	.	+	.	9	24	.	.	2	15	7	41
.	1	2	1	.	2	2	2	.	+	2	.	.	.	.	3	.	.	.	19	51	.	.	11	85	8	47
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	2	29	.	.	.	.
1	1	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	15	41	7	100	7	54	1	6
+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6	16	1	14	4	31	1	6
.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	.	.	1	6
+	.	+	.	+	.	.	+	+	.	+	+	.	+	.	+	.	1	+	16	43	.	.	6	46	10	59
.	.	.	.	.	.	.	.	+	1	1	+	.	1	+	+	.	.	.	16	43	1	14	8	62	7	41
.	+	.	+	.	.	+	.	+	+	.	+	.	+	.	.	.	+	+	15	41	.	.	7	54	8	47
+	+	+	.	+	+	r	.	.	+	1	.	.	.	.	.	.	.	.	14	38	.	.	8	62	6	35
.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	14	38	2	29	9	69	3	18
+	1	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	12	32	1	14	9	69	2	12
.	+	+	1	.	1	+	+	+	.	.	+	.	.	.	.	.	+	.	10	27	.	.	2	15	8	47
.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	8	22	3	43	3	23	2	12
.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	+	+	+	8	22	.	.	2	15	6	35
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	8	22	7	100	.	.	1	6
+	.	.	+	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.	7	19	1	14	2	15	4	24
.	.	.	.	.	.	.	.	+	.	.	.	+	.	1	+	+	.	+	6	16	.	.	.	.	6	35
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	3	.	.	.	.	1	6
.	.	+	.	.	.	+	.	.	.	.	.	.	1	.	.	.	.	.	6	16	.	.	3	23	3	18
.	.	+	+	+	+	+	r	.	.	.	.	.	.	.	.	.	.	.	6	16	.	.	.	.	6	35
.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	.	.	3	23	2	12
.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	+	.	5	14	.	.	1	8	4	24
.	.	.	.	.	.	.	.	.	2	1	.	.	+	3	.	.	.	.	5	14	.	.	1	8	4	24
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	4	11	.	.	3	23	1	6
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	.	.	3	23	.	.
.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	3	8	.	.	.	.	3	18
.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	+	.	2	5	.	.	.	.	2	12
+	+	+	+	+	+	+	+	.	+	.	.	+	.	+	+	+	+	.	25	68	5	71	8	62	12	71
.	2	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	8	22	.	.	5	38	3	18
+	+	1	1	.	3	1	.	+	.	.	.	.	.	.	.	.	.	.	17	46	4	57	8	62	5	29
.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	.	.	2	12
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	1	14	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	11	.	.	4	31	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	1	14	4	31	.	.
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	1	14	4	31	.	.
+	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	4	11	.	.	2	15	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	.	.	3	23	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	1	14	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	.
.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	1	8	1	6
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2	5	.	.	1	8	1	6
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	2	5	.	.	1	8	1	6
.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	.	.	2	12
+	.	.	.	.	.	.	.	2	+	.	2	+	2	.	+	.	2	+	19	51	6	86	5	38	8	47
.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	5	14	.	.	3	23	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	3	43	.	.	.	.

	Relevé number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Cyclamen purpurascens	III	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.
	Dentaria enneaphyllos	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AU	***ALNO-ULMION***																			
	Impatiens noli-tangere	III	.	+	+	+	+	+	.	1	.	3	3	+	+	+	.	1	2	2
	Chrysosplenium alternifolium	III	+	.	+	+	.	+	.	+	+	1	1	.	.	.	.	+	1	+
	Deschampsia cespitosa	III	.	.	.	.	.	+	.	.	+	+	.	+	.	.	1	1	.	.
	Carex brizoides	III	2	+	.	+	+	+	.	.	.	1	.	.	.	+	.	.	+	.
	Chaerophyllum hirsutum	III	.	.	.	.	.	+	.	+	.	+	.	.	.	1	.	+	.	.
	Stachys sylvatica	III	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	+
	Alnus incana	Ia	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	.	.	.
	Alnus incana	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	1	+
	Alnus incana	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
	Festuca gigantea	III	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	r	.	.
	Dryopteris carthusiana	III	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Angelica sylvestris	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.
	Stellaria nemorum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Matteuccia struthiopteris	III	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+	.
	Thalictrum aquilegiifolium	III	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
VP	***VACCINIO-PICEETEA***																			
	Oxalis acetosella	III	+	+	1	1	1	1	1	+	+	1	2	.	+	1	.	+	2	.
	Picea abies	Ia	.	+	.	.	1	.	.	+	.	.	+	+	+	.	.	.	.	.
	Picea abies	Ib	.	.	.	.	+	.	.	.	.	.	.	.	2	+	.	1	.	.
	Picea abies	II	+	.	+	.	.	.	.	+	.	+	+	+	+	.	+	+	.	+
	Picea abies	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Gentiana asclepiadea	III	.	.	+	.	.	.	.	+	+	+	+	.	+	+	.	.	+	+
	Luzula pilosa	III	+	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.
	Hieracium sylvaticum	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.
	Veronica urticifolia	III	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.
	Solidago virgaurea	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.
	Huperzia selago	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Luzula sylvatica	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
A	***ADENOSTYLETALIA***																			
	Athyrium filix-femina	III	2	1	+	2	2	2	2	+	1	1	1	2	.	+	+	1	+	+
	Senecio fuchsii	III	.	.	+	+	+	+	+	.	.	.	+	.	+	+	.	+	.	+
	Myosotis sylvatica	III	.	.	+	.	.	+	.	+	+	.	+	.	+	.	+	.	.	+
	Anthriscus nitidus	III	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.
	Senecio nemorensis	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
	Silene dioica	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
	Veratrum album	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AT	***ASPLENIETEA TRICHOMANIS***																			
	Cystopteris fragilis	III	.	.	.	.	.	.	.	+	+	+	+	.	.	+	+	.	+	.
	Polystichum x illyricum	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+	+
	Polypodium vulgare	III	.	+	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.
	Asplenium trichomanes	III	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	.	+
	Asplenium viride	III	.	.	.	.	.	.	.	+	+	.	+	.	.	.	.	.	.	.
	Cardaminopsis arenosa	III	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.
O	***OTHER SPECIES***																			
	Rubus fructicosus agg.	II	.	+	+	+	1	+	+	+	+	.	.	+	.	3	.	+	2	+
	Rubus fructicosus agg.	III	+	.	.	.	.	.	.	1	2	+	1	1	+	1	+	.	.	1
	Galeopsis speciosa	III	.	.	+	+	.	.	.	.	.	r	1	.	.	.	+	+	+	+

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37							
+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	1	14	2	15	.	.
.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	.	.	+	.	.	2	+	+	+	+	+	.	1	2	1	+	1	26	70	5	71	9	69	12	71
.	+	.	.	.	.	.	1	+	+	1	+	1	+	1	1	.	.	+	22	59	4	57	8	62	10	59
.	.	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	+	+	12	32	1	14	5	38	6	35
.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	24	5	71	4	31	.	.
.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	7	19	1	14	4	31	2	12
.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	+	6	16	.	.	4	31	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	11	.	.	4	31	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	3	.	.	1	8	.	.
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	1	14	4	31	.	.
+	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	4	11	1	14	1	8	2	12
.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	3	8	.	.	1	8	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	2	3	8	.	.	.	.	3	18
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	1	14	1	8	.	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	2	5	.	.	1	8	1	6
+	+	1	+	+	+	+	1	+	+	+	1	1	1	1	1	+	+	2	34	92	7	100	10	77	17	100
.	.	+	.	.	.	.	.	.	.	.	1	+	.	.	+	+	+	3	13	35	2	29	4	31	7	41
+	.	.	.	.	.	.	.	1	.	.	.	.	+	.	.	.	1	+	9	24	1	14	4	31	4	24
.	.	1	+	+	+	1	+	.	.	+	1	+	+	.	.	+	.	.	21	57	2	29	8	62	11	65
.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	3	8	.	.	.	.	3	18
1	+	1	+	+	+	1	+	+	.	+	+	+	1	+	+	+	+	+	27	73	1	14	10	77	16	94
+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	3	43	2	15	.	.
.	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	+	4	11	.	.	1	8	3	18
.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	3	8	.	.	1	8	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	
.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	2	5	.	.	.	.	2	12
+	+	1	2	+	1	1	1	+	+	1	+	+	+	+	+	+	1	1	36	97	7	100	12	92	17	100
.	.	+	+	.	+	+	1	+	.	.	+	+	+	.	.	.	+	1	21	57	5	71	5	38	11	65
.	+	.	+	.	.	.	.	+	.	.	+	.	.	.	+	.	.	.	13	35	2	29	7	54	4	24
.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	4	11	.	.	2	15	2	12
.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	3	8	.	.	1	8	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	3	8	.	.	1	8	2	12
.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	2	5	.	.	.	.	2	12
+	+	.	.	.	.	.	.	r	.	+	+	+	+	.	.	.	.	r	15	41	.	.	9	69	6	35
+	.	.	.	.	.	.	r	.	.	.	+	.	.	.	+	.	+	.	9	24	.	.	5	38	4	24
.	.	.	.	.	.	.	+	.	.	.	+	.	+	.	.	.	.	+	7	19	2	29	1	8	4	24
.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	.	.	.	7	19	.	.	4	31	3	18
.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	11	.	.	4	31	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	2	29	1	8	.	.
.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	+	.	16	43	6	86	7	54	3	18
+	2	+	+	.	.	+	.	+	.	.	+	.	.	.	.	.	+	.	17	46	1	14	11	85	6	35
.	+	.	.	.	.	.	r	+	.	+	.	.	+	+	+	.	+	+	17	46	2	29	7	54	8	47

	Relevé number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Cardamine flexuosa	III	.	.	.	.	.	+	.	.	.	+	+	.	.	.	+	+	+	.
	Sorbus aucuparia	Ia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Sorbus aucuparia	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Sorbus aucuparia	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Sorbus aucuparia	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Hypericum hirsutum	III	.	.	.	.	.	.	.	+	+	r	+	.	.	.	.	.	.	.
	Rubus idaeus	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Salix caprea	Ib	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Ajuga reptans	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.
	Alliaria petiolata	III	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.
	Chaerophyllum aureum	III	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+
	Sambucus racemosa	II	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Sambucus racemosa	III	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
M	***MOSSES***																			
	Plagiomnium undulatum	IV	+	+	+	+	.	.	.	+	+	1	+	.	.	4	.	.	1	.
	Plagiothecium nemorale	IV	+	.	.	+	+	.	+	.	+	.	2	.	.	.	.	.	.	.
	Brachythecium rutabulum	IV	+	.	.	+	.	.	.	+	+	+	.	.	.	+	.	.	1	.
	Hypnum cupressiforme	IV	.	.	+	.	.	.	+	.	.	1	+	.	+	.	.	.	+	.
	Eurinchium angustirete	IV	+	.	.	.	.	.	+	1	+	+	+	.	.	.	.	.	+	.
	Ctenidium molluscum	IV	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.
	Plagiochila asplenioides	IV	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Atrichum undulatum	IV	.	1	+	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.
	Brachythecium populeum	IV	.	.	.	.	.	.	.	+	.	+	.	.	1	.	.	+	+	.
	Plagiomnium affine	IV	.	.	.	.	.	.	.	.	.	+	1	.	.	+	.	.	+	.
	Isotechyum alopecuroides	IV	.	+	.	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.
	Plagiothecium denticulatum	IV	.	.	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.
	Polytrichum formosum	IV	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Eurhynchium praelongum	IV	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.
	Schistidium apocarpum	IV	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.
	Thuidium tamariscinum	IV	.	.	+	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.
	Herzogiella seligeri	IV	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Dicranum scoparium	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Rhizomnium punctatum	IV	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Marchantia polymorpha	IV	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Bryum species	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Plagiomnium cuspidatum	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Hylocomium splendens	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
	Brachythecium plumosum	IV	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37								
.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	+	+	.	.	11	30	1	14	5	38	5	29
.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	1	3	.	.	.	.	1	6
.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	2	5	.	.	.	.	2	12
+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	3	8	.	.	1	8	2	12
.	.	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	+	5	14	.	.	.	.	5	29
+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	14	.	.	5	38	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	3	8	.	.	.	.	3	18
.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	1	8	1	6
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	2	15	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	1	14	1	8	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	+	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	2	5	.	.	.	.	2	12
+	.	+	.	.	.	.	+	1	.	.	1	.	+	.	+	+	.	+	19	51	4	57	7	54	8	47
+	+	.	.	.	+	.	.	.	.	+	1	.	.	.	+	.	+	1	14	38	4	57	4	31	6	35
1	+	.	.	.	+	.	.	+	.	+	+	.	+	.	.	.	.	.	14	38	2	29	7	54	5	29
.	.	.	.	.	.	.	+	.	2	+	+	+	4	.	.	+	.	1	14	38	2	29	4	31	8	47
2	1	.	.	.	.	.	.	+	.	.	2	.	+	.	.	.	.	.	12	32	2	29	7	54	3	18
1	.	.	.	.	.	.	.	.	.	+	+	.	+	.	+	.	+	+	9	24	.	.	3	23	6	35
+	+	.	.	.	.	.	.	.	.	+	1	.	.	.	.	+	.	+	8	22	2	29	2	15	4	24
.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	1	.	+	7	19	2	29	1	8	4	24
1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	7	19	.	.	6	46	1	6
+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	7	19	.	.	6	46	1	6
.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	6	16	2	29	2	15	2	12
.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	+	6	16	3	43	.	.	3	18
+	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	+	.	+	6	16	1	14	1	8	4	24
.	+	+	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	6	16	.	.	2	15	4	24
.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	+	6	16	.	.	2	15	4	24
.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	5	14	2	29	1	8	2	12
.	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	+	5	14	1	14	1	8	3	18
.	.	.	.	.	.	.	.	.	.	.	+	1	3	.	.	+	.	+	5	14	.	.	.	.	5	29
.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	+	.	+	4	11	1	14	.	.	3	18
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	2	29	.	.	.	.
.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	2	5	.	.	.	.	2	12
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	2	5	.	.	.	.	2	12

Table 6: Synoptic table of Illyrian maple forests and comparison to Central-european maple forests on the silicate bedrock

Tabela 6: Sinoptična tabela ilirskih javorjevih gozdov in primerjava s srednjeevropskimi javorjevimi gozdovi na silikatni matični podlagi

Number of syntaxon		1	2	3	4	5	6	7	8	9	10	11	**12**	13	14
Number of relevés		22	51	7	5	15	15	18	18	9	7	25	**37**	7	6
		Fraxino-Acerion												*Tilio-Acerion*	
DIFFERENTIAL SPECIES OF ASSOCIATION *Dryopterido affini-Aceretum*															
Dryopteris affinis	III	9				7	20	28	22		29		**81**	100	
Dryopteris dilatata	III	18	6					6			29	8	**51**	71	67
Luzula luzuloides	III				20	7	7	6					**46**	43	33
Phegopteris connectilis	III	14				13	7	6	6	11		4	**43**		33
Gymnocarpium dryopteris	III	9					7						**30**		33
CHARACTER SPECIES OF ALLIANCE *Fraxino-Acerion*															
Lamium orvala	III	32	75	86	80	100	93	78	50	56	100	72	**22**		
Stellaria montana	III	73	47	100		13	53	39	50	33		40	**92**		
Doronicum austriacum	III	32	22	100	60	7	7	33	11			52	**57**		
Polystichum setiferum et xbicknellii	III	14	61				33	17		11			**35**		
Isopyrum thalictroides	III		53	71		100	60	39					**14**		
Scopolia carniolica	III	45	53	43				17					**19**		
Polystichum braunii et xluerssenii	III	50					47		22				**43**	57	
Tanacetum macrophyllum	III				100										
REGIONAL CHARACTER SPECIES OF ALLIANCE *Fraxino-Acerion* (differential species towards *Aremonio-Fagion*)															
Acer pseudoplatanus	I	100	100	86	80	80	67	94	94	78	100	100	**95**	57	100
Acer pseudoplatanus	II	36	53	71	40	67	53	61	83	67	43	32	**35**	14	83
Acer pseudoplatanus	III	77	75	29	40	47	73	78	6		57	76	**73**	14	
Actaea spicata	III	73	49	14	100	27	60	56	89	56	86	80	**51**	14	33
Fraxinus excelsior	I	5	14	100	100	100	100	100	94	100	100	4	**43**	29	17
Fraxinus excelsior	II		10	86	40	60	73	61	83	100	57	4	**32**		
Fraxinus excelsior	III	5	4	29	100	33		78	39		14		**30**	14	
Sambucus nigra	I		2	14									**11**	14	
Sambucus nigra	II	86	96	100	100	7	47	78	67	89	71	12	**54**	14	
Sambucus nigra	III		2										**30**	57	
Urtica dioica	III	82	92	100	100	20	53	39	56	44	86	100	**78**		67
Lunaria rediviva	III	14	75	100	100	13	47	22	17	11	100	36	**32**		67
Ulmus glabra	I	41	53	57	40		13	50	56	22		12	**38**	71	50
Ulmus glabra	II	45	49	29	60	20	60	61		22		12	**57**	29	50
Ulmus glabra	III	9	2		40			6				12	**27**	29	
Circaea lutetiana	III	50	61	57	100	7	47	22	39	11		12	**51**		17
Geranium robertianum agg.	III	73	51	14	100		27	11	72	67	100	80	**54**		100
Aruncus dioicus	III		8	43	20	20	20	67	50	22	29	4	**46**	57	
Arum maculatum	III	86	88	100	40	67	80	72	33	22		8			33
Phyllitis scolopendrium	III	68	63	29			40	28	61	44	71	36	**3**		17
Polystichum aculeatum	III	50	16				20	39	39	11	57	64	**32**	100	50
Adoxa moschatellina	III	73	71	100		73	73	39	33		71	96	**76**		
Tilia platyphyllos	I	27	8						22	11			**3**		

Number of syntaxon		1	2	3	4	5	6	7	8	9	10	11	**12**	13	14
Number of relevés		22	51	7	5	15	15	18	18	9	7	25	**37**	7	6
Tilia platyphyllos	II	5	8			13		22		11					33
Tilia platyphyllos	III	5					13	6							
Glechoma hederacea agg.	III		51	86	100	27	13	28	22	44			**14**		
Geum urbanum	III			57	100	47	33	6	39	22		12	**11**		
Acer platanoides	I		29		40		13	11	6						
Acer platanoides	II		16	14	40	40	27	28							
Acer platanoides	III		4		20		27	6							
Euonymus latifolia	II		12				20	6	17						
Euonymus latifolia	III			14						22					
Circaea x intermedia	III	9	4						6		57		**5**		
Hesperis matronalis	III		4	43			7								
Tilia cordata	I								50	11					
Tilia cordata	II						7		44						
Tilia cordata	III								6						
Ribes alpinum	II							6				8			
Ribes alpinum	III														33
Circaea alpina	III											20	**8**		50
Staphylea pinnata	II	23						11							
Asperula taurina	III								33	11					
Ribes uva-crispa	II	5													
Botrychium virginianum	III					20									

***AREMONIO-FAGION* and *ERYTHRONIO-CARPINION* species (differential species towards *Tilio Acerion*)**

Cardamine trifolia	III	73	4	29	100	87	40	50	17	44	29	68	**51**	14	
Dentaria enneaphyllos	III	86	65	57	100	47	53	28	11		86	92	**5**	57	
Cyclamen purpurascens	III		16	14	40	53	40	50	22	22	43		**8**		
Aposeris foetida	III			71	60	100	80	83	6	33	29				
Vicia oroboides	III	9	8	71	60	13	27	28							
Aremonia agrimonoides	III	23	4		40	33	7		6			28			
Primula vulgaris	III				60	47	7	11	44	56					
Omphalodes verna	III	86					20	39	17			4			
Dentaria trifolia	III		53	43		73	53						**57**		
Hacquetia epipactis	III		8		20	73	67	72							
Helleborus odorus	III		8				33	50	56	22					
Knautia drymeia	III			57	20			11	11				**14**		
Euphorbia carniolica	III			57			20	50				4	**8**		
Helleborus niger	III					53	7	17	6		29				
Dentaria polyphylla	III	5	78	57	80										
Lonicera caprifolium	II						7	39	11						
Lonicera caprifolium	III									11					
Geranium nodosum	III	64							11			8			
Crocus napolitanus	III					100	53	78							
Anemone trifolia	III							50	28	67					
Calamintha grandiflora	III	32										28			
Ruscus hypoglossum	III		4					6							
Erythronium dens-canis	III				40					11					
Rhamnus fallax	II										43	4			
Eranthis hyemalis	III		8												
Helleborus atrorubens	III		4												
Epimedium alpinum	III									33					

1. *Omphalodo vernae-Aceretum,* (P. Košir 2000, Table 2, relevés 1–22)
2. *Dentario polyphyllae-Aceretum* (P. Košir 2000, Table 3, relevés 1–51)
3. *Chrysanthemo macrophylly-Aceretum* (P. Košir 2004, Table 8, relevés 1–7)
4. *Aceri-Fraxinetum* (Petračić & Anić 1952, Table 2, relevés 1–5)
5. *Hacquetio-Fraxinetum* var. geogr. *Dentaria pentaphyllos dentarietosum trifoliae* var. *Carpinus betulus* (Marinček 1995, Table 4, relevés 1–15)
6. *Hacquetio-Fraxinetum dentarietosum trifoliae* et *omphalodetosum vernae* (Marinček 1990, Table, releves 1–18, without relevés 6, 9, 10)
7. *Hacquetio-Fraxinetum* (P. Košir 2002, Table 1, relevés 1–18)
8. *Hacquetio-Fraxinetum* var. geogr. *Anemone trifolia* (Lasen & Urbinati 1995, Table 1, group H)
9. *Hacquetio-Fraxinetum* var. geogr. *Anemone trifolia* (Poldini & Nardini 1993, Table 1, relevés 1–9)
10. *Lamio orvalae-Aceretum* (P. Košir 2000, Table 1, relevés 1–7)
11. *Lamio orvalae-Aceretum* (P. Košir 2004, Table 5, relevés 8–32)
12. ***Dryopterido affini-Aceretum* (P. Košir 2005 hoc loco, Table 5, relevés 1–37)**
13. *Arunco-Aceretum* (Sturm 1978, Table B, relevés 6–12)
14. *Aceri-Fraxinetum typicum* (Büker 1942, Table, relevés 1–6)